17/E

IMPERIAL MYCOLOGICAL INSTITUTE
14 OCT. 1935

BRITISH GUIANA.
DEPARTMENT OF AGRICULTURE.

SUGAR BULLETIN No. 4.

FIELD EXPERIMENTS WITH SUGAR CANE, IV.

BY

C. HOLMAN B. WILLIAMS,
Sugar Agronomist,

R. R. FOLLETT-SMITH,
Chemist-Ecologist,

AND

C. CAMERON,
Field Manager.

WITH

A PREFATORY NOTE

BY

PROFESSOR J. SYDNEY DASH,
Director of Agriculture.

THE "DAILY CHRONICLE," GEORGETOWN, DEMERARA,
1935.

BRITISH GUIANA.
DEPARTMENT OF AGRICULTURE.

SUGAR BULLETIN No. 4.

FIELD EXPERIMENTS WITH SUGAR CANE, IV.

BY

C. HOLMAN B. WILLIAMS,
Sugar Agronomist,

R. R. FOLLETT-SMITH,
Chemist-Ecologist,

AND

C. CAMERON,
Field Manager.

WITH

A PREFATORY NOTE

BY

PROFESSOR J. SYDNEY DASH,
Director of Agriculture.

THE "DAILY CHRONICLE," GEORGETOWN, DEMERARA,
1935.

Digitized by the Internet Archive
in 2025

https://archive.org/details/sugar-bulletin-department-of-agriculture-british-guiana_1935_4

SUGAR EXPERIMENT STATIONS' COMMITTEE, JUNE, 1935.

Director of Agriculture (*Chairman*),

Hon. M. B. G. Austin,

Mr. A. Murison,

Mr. R. E. Rhodes,

Mr. G. M. Eccles,

Mr. J. Sutherland (*Acting for Mr. J. Bee*),

Mr. F. F. Ross (*Acting for Mr. J. C. Gibson*),

Mr. C. L. C. Bourne (*Secretary*).

Note :—The cost of publishing this Bulletin has been met from the funds of the Sugar Experiment Stations' Committee.

LIST OF COLLABORATING STAFF.

ADMINISTRATION.

J. Sydney Dash, B.S.A., ... Director of Agriculture.
F. Burnett, M.C., M.A., ... Deputy Director of Agriculture.

SUGAR EXPERIMENT STATIONS.

C. Holman B. Williams, M.A., A.I.C.T.A., Dip. Agr., Sugar Agronomist.
C. Cameron, ... Field Manager.
L. A. Forte, ... „ Assistant.
B. A. MacArthur, ... „ „
St. G. C. Cooper, Dip. Agr., ... „ „
L. A. Robinson (*Seconded*), ... Laboratory „
H. B. Singh, ... „ „
J. B. Bourne, ... Clerical „

DEPARTMENT OF AGRICULTURE.

R. R. Follett-Smith, B.Sc., A.R.C.S., ... Chemist-Ecologist.
C. L. C. Bourne, ... Assistant Chemist.
H. Macluskie, U.D.A., ... Agricultural Superintendent.
J. D. Gillespie, B.Sc., ... „ „
A. A. Abraham, ... Assistant „ „

TABLE OF CONTENTS.

	Page
PREFACE—	i
INTRODUCTION—	1
VARIETY TRIALS—	1
Plant Cane Variety Trials	2
Sophia	2
East Demerara	22
First Ratoon Variety Trials	23
Sophia	23
Berbice	35
East Demerara	41
West Demerara	45
Second Ratoon Variety Trials	50
Sophia	50
Berbice	54
East Demerara	60
Discussion and Summary of Results	63
MANURIAL TRIALS—	75
Experiments with Graded Dressings of Nitrogenous Manures ...	75
Sulphate of Ammonia on Flood-fallowed Frontland ...	75
„ „ „ „ Pegassy Clay Soils	80
Experiments with Lime-bearing Materials	88
Comparison of Lime and Limestone on Pegassy Clay ...	88
Experiments with Phosphatic Manures	89
Comparison of Various Sources of Phosphate	89
„ „ Graded Doses of Phoshate and Different Methods of Application	92
Summary	94
Sulphate of Ammonia	94
Organic Nitrogenous Manures	95
Lime-bearing Materials	95
Phosphatic Manures	95
Potassic Manures	95
FLOOD-FALLOWING TRIALS—	96
Introduction	96
Results	98
Summary	104
APPENDIX I	105
APPENDIX II	112
APPENDIX III	120

PREFATORY NOTE.

The appearance of *Sugar Bulletin* No. 4 of the Department of Agriculture, British Guiana, recording the results of investigations carried on during the period July 1934 to June 1935, synchronises with an epoch during which the price of sugar has reached the lowest point in the history of the industry. Those engaged or having capital invested in sugar production are anxiously asking whether the bottom has yet been reached and, if so, when an improvement may be expected. It is significant, nevertheless, and gratifying to have to record, that during these difficult times the industry in this Colony has not gone back, but rather has made considerable strides forward despite the severe additional blow suffered in 1934 as a result of the floods, which caused actual losses to the extent of 20,000 tons and took a heavy toll of the experimental work. At the time of writing, recovery from flood losses, if only in terms of production, may be pointed to with satisfaction and, indeed, the yields during the reaping period just finished have reached an unprecedented high average figure of approximately 3 tons of sugar per acre from all categories of cane reaped (plants, first, second and, in many cases, third ratoons).

In *Sugar Bulletin* No. 1, published in 1932, it was reported that D. 625, a comparatively old variety bred in 1892, still occupied 90 per cent. of the area devoted to cane. This figure no longer represents the case; while this variety still continues to prove its usefulness, occupying approximately 60 per cent. of the cane area, search and test have revealed two canes which are being rapidly established and are already superseding it in some areas, namely Diamond 10 (bred by Plantation Diamond) and P.O.J. 2878. These two varieties have juice qualities superior to the standard cane and are undoubtedly better ratooners. In addition, there are other varieties bred at the Sugar Experiment Station also capable of replacing D. 625 with advantage; while still another batch of more recent creation, containing seedlings such as D. 49/30 and D. 66/30, bids fair to outstrip both Diamond 10 and P.O.J. 2878. The two former have only been tested as plants but have given yields of 142.6 and 130.2 per cent. of the standard cane (100 per cent.). These are the highest yielders yet recorded locally and should they maintain this performance in their ratoon trials, an important consideration here, the average yield per acre will soon reach a still higher figure than that mentioned above.

It is now clear that planters need no longer harbour the fear that there are no varieties to take the place of D. 625 which has served and continues to serve them well in some areas. The task is, rather, to find a variety which will out-

yield Diamond 10 and P.O.J. 2878. Here again, the outlook has never been so promising; in fact, one of the difficulties now confronting the Department is to be able to test effectively and expeditiously all the excellent varieties which have been bred, notably since 1930. In this connection, the financial assistance received from the Colonial Development Fund has been most helpful.

It is hardly necessary to refer at any length here to the progress which has been made in the collection of data bearing on the soil problems of the Colony and which have had an important bearing on the drawing up of chains of fertilizer experiments in an endeavour to find a manurial policy of practical and economic value which could be recommended with confidence to the industry. Local soils have undergone considerable changes, an outstanding one being a change over from high alkalinity to high acidity during the last twenty years. A further complication is the fact that a liming programme on a scale indicated by the change, appears, as a result of experiments recorded, to offer no economic return, and yet the need for some liming practice cannot be lightly passed over in view of profits shown to be derived from increasing applications of nitrogen and the concomitant fear of thereby still further increasing soil acidity. These points have received elucidation in the section dealing with manurial experiments and suitable advice has been framed over the whole range of plants and ratoons in the light of the results so far obtained. This may need to be modified when further experience is gained over a wider range of trials on the various soil types of the Colony. In this connection, I desire to pay tribute to the generosity of Messrs. Imperial Chemical Industries, Ltd., and Messrs. Booker Bros. McConnell & Co., Ltd., who have provided financial assistance for the prosecution of further work on the all-important question of fertilizers under the conditions of cane growth in this Colony.

The soil research work of the Department embraces the study of the effects of flood-fallowing, a practice which had its beginnings locally as a pest control measure and which has developed to such an extent as to have become one of the most important field practices. Its value as a soil improver is no longer in doubt even though how it actually works still requires complete elucidation. Nevertheless, substantial progress has been achieved, by the Chemist-Ecologist, in the study of this interesting problem to which reference is made in the Bulletin when discussing results from a series of experiments designed to throw light on the economics of the practice. While the floods vitiated the experiments in one centre and render further work very essential, a certain amount of useful information has been obtained from the other trials which still have to be carried to finality. It would appear that, contrary to local belief, depth of water is not of prime importance, so long as the land remains submerged; on the other hand, duration of submergence is. There are other related factors brought out in the discussion of the results obtained which are being followed with unusual interest.

In conclusion it may be said that this intensive programme of cane breeding, experimentation and research work is receiving full appreciation from the local sugar interests and is attracting increasing recognition abroad, albeit a contributor to one of the British technical journals has recently seen fit to omit from his list of Empire cane-breeding stations one which has been breeding canes since 1889 and which, besides supplying fully the needs of British Guiana, where yield per acre now exceeds that of most other Empire countries, has contributed to the outside world such outstanding canes as D. 74, D. 95, D. 109, D. 117, D. 433 and D. 1135.

J. Sydney Dash,
Director of Agriculture.

FIELD EXPERIMENTS WITH SUGAR CANE, IV.

BY

C. HOLMAN B. WILLIAMS, *Sugar Agronomist*,

R. R. FOLLETT-SMITH, *Chemist-Ecologist*,

AND

C. CAMERON, *Field Manager*.

INTRODUCTION

This Bulletin records the results obtained from field experiments with sugar cane reaped during the year ended June 30, 1935. Three similar Bulletins, dealing with the earlier phases of the work, have already appeared. The methods adopted in the execution of the trials have been described in the Introduction to the first Bulletin of the series. The present Bulletin is divided into three sections, *viz.*,

Variety Trials—dealing with 38 experiments;

Manurial Trials—dealing with 17 experiments;

Flood-fallowing Trials—dealing with 4 experiments.

The disastrous floods of December—January 1933—1934 damaged a number of trials and they had to be abandoned. In consequence some of the experiments discussed as plant canes or first ratoons in *Sugar Bulletin* No. 3 do not appear in this Bulletin since it was decided not to take them through to the end of the three-crop cycle. Likewise the comparatively small number of plant cane variety trials (on estates) dealt with in this Bulletin is accounted for by serious depletion of the Sophia nurseries consequent on the flood damage. This unavoidable arrest in the long and difficult task of sorting out the new seedlings is to be greatly deplored.

VARIETY TRIALS.

The variety trials will be described under four sub-sections, *viz.*, (a) plant cane trials, (b) first ratoon trials, (c) second ratoon trials, and (d) discussion and summary.

SUB—SECTION A.—PLANT CANE VARIETY TRIALS.

Plant Cane Variety Trials Reaped at Sophia Sugar Experiment Station.

A list of the plant cane variety trials reaped at the Sophia Sugar Experiment Station during the period under review is given in Table I.

TABLE I.

Plant Cane Variety Trials Reaped at Sophia Experiment Station.

Field.	Age of Canes, Months.	Date of Planting.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
11 East A	15.00	23.VI.33	20.IX.34	7	5	Randomised Blocks.
11 „ B	15.00	23.VI.33	20.IX.34	7	5	„
11 „ C	15.00	23.VI.33	20.IX.34	7	5	„
11 „ D	15.00	23.VI.33	20.IX.34	7	5	„
12 „ A	14.75	24.VI.33	18.IX.34	5	5	Latin Square.
12 „ B	14.75	24.VI.33	18.IX.34	5	7	Randomised Blocks.
13 „ A	15.50	1.VI.33	13.IX.34	7	5	„
13 „ B	15.50	1.VI.33	13.IX.34	7	5	„
13 „ C	15.50	1.VI.33	13.IX.34	7	5	„
13 „ D	15.50	1.VI.33	13.IX.34	7	5	„
16 „ A	15.75	24. V.33	12.IX.34	7	5	„
16 „ B	15.75	24. V.33	12.IX.34	7	5	„
16 „ C	15.75	24. V.33	12.IX.34	7	5	„
16 „ D	15.75	24. V.33	12.IX.34	7	5	„
6 West A	11.50	29.IV.34	15.IV.35	6	6	Latin Square.
6 „ B	11.50	29.IV.34	15.IV.35	6	6	„
13 „	12.25	6.IV.34	17.IV.35	10	7	Randomised Blocks.

The monthly rainfall recorded at Sophia during the progress of the experiments is compared in Appendix I with the mean monthly rainfall experienced at the Station during preceding years, and the variations from the monthly normal are there indicated for each experiment.

Composite topsoil and subsoil samples were collected from each experimental site. The results of their laboratory examination are given in Appendix II.

With the exception of one trial (Experiment A in Field 12 East) all the plant cane experiments reaped at Sophia were of a preliminary nature intended to serve for the rapid elimination of unsuitable canes among the large number of newer seedlings available.

The scheme is to place all likely new canes in replicated experiments (small plots of 0.0255 acre) and operate a broad selection into "definitely poor" and "worthy of further trial" groups, on the basis of the plant cane results only. The plots are allowed to ratoon and those canes falling into the second category

are cut after about nine months and put into further experiments which will be allowed to go through a three-crop cycle (plant canes, first and second ratoons). In this way it is possible to save further work on a number of canes difficult to judge by inspection, and, since the ratooned plots yield appreciable amounts of planting material, to establish three simultaneous experiments with each of the canes falling into the "worthy of further trial" group. It is, of course, obvious that in selecting on the results of a single trial, and as plant canes only, one has to be "lenient" in rejections or else run the risk of too precipitately condemning a useful cane.

TABLE II.—Results of 4 Variety Trials in Field 11 East, Sophia.

PLANTS, 15.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
			Experiment		**A.**		
MEAN YIELDS:	D. 171/29	39.66	11.10	11.58	81.1	4.40	118.60
	D. 404/17	34.45	11.66	8.64	83.9	4.03	108.63
	D. 87/27	34.21	10.99	9.47	82.9	3.77	101.62
	D. 625	30.09	11.87	11.27	84.0	3.56	95.96
	D. 52/30	28.50	12.18	7.52	84.9	3.48	93.89
	D. 85/30	31.66	10.77	18.97	79.3	3.41	91.91
	D. 668/18	27.51	11.97	7.07	85.1	3.33	89.76
	Mean:					3.71	100.00
	Standard Error:					—	—
	Significant Difference, 20: 1:					—	—
			Experiment		**B.**		
MEAN YIELDS:	D. 113/30	45.18	11.11	13.60	81.3	4.92	117.99
	D. 67/30	34.51	13.76	6.48	87.3	4.73	113.43
	D. 173/30	37.10	12.69	6.50	87.8	4.70	112.71
	D. 205/30	35.40	11.61	6.91	86.0	4.10	98.32
	D. 625	32.52	12.24	10.54	83.3	3.95	94.72
	D. 190/30	31.89	11.23	8.94	84.5	3.59	86.09
	D. 138/30	26.65	11.94	8.68	84.6	3.18	76.26
	Mean:					4.17	100.00
	Standard Error:					0.27	6.47
	Significant Difference, 20: 1:					0.87	20.86
			Experiment		**C.**		
MEAN YIELDS:	D. 88/30	38.09	10.37	17.86	77.9	3.96	108.49
	D. 103/30	32.72	12.00	6.87	84.7	3.94	107.95
	D. 81/30	33.26	11.64	12.17	82.9	3.87	106.03
	D. 625	28.08	13.35	7.86	84.9	3.75	102.74
	D. 168/30	28.07	12.73	8.08	83.5	3.58	98.08
	D. 146/30	31.30	10.83	10.20	79.6	3.42	93.70
	D. 181/30	24.02	12.58	5.89	85.8	3.03	83.01
	Mean:					3.65	100.00
	Standard Error:					—	—
	Significant Difference, 20: 1:					—	—
			Experiment		**D.**		
MEAN YIELDS:	D. 84/30	31.52	13.95	6.33	87.8	4.41	110.80
	D. 79/30	33.82	12.86	8.52	84.1	4.32	108.54
	D. 167/30	36.36	11.48	8.36	82.4	4.18	105.03
	D. 78/30	35.36	11.61	10.65	81.1	4.10	103.02
	D. 625	31.60	12.86	6.72	85.3	4.08	102.51
	D. 83/30	26.59	13.88	6.48	84.7	3.69	92.71
	D. 89/30	24.12	12.74	7.04	85.1	3.09	77.64
	Mean:					3.98	100.00
	Standard Error:					—	—
	Significant Difference, 20: 1:					—	—

The results of the four trials in Field 11 East, Sophia, are presented in Table II and are shown graphically in Figures I to IV.

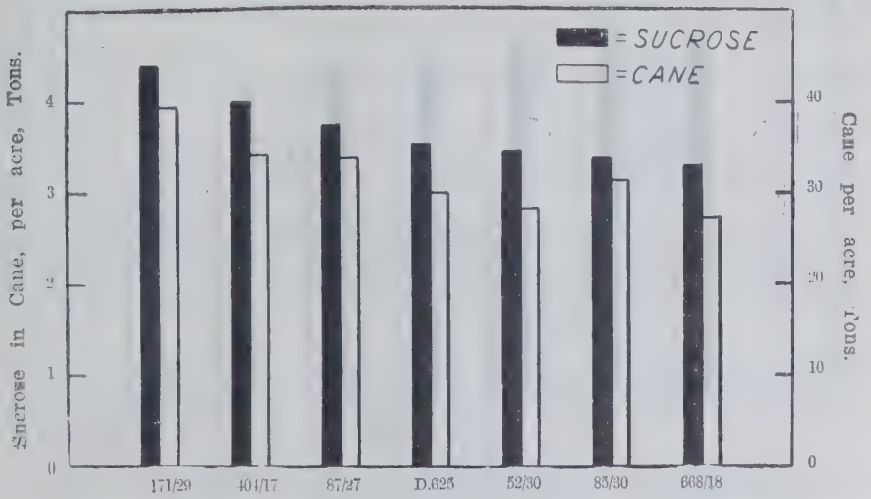

FIG. I.

Sucrose and Cane Yields from Field 11E., (A), Sophia (Plant Canes).

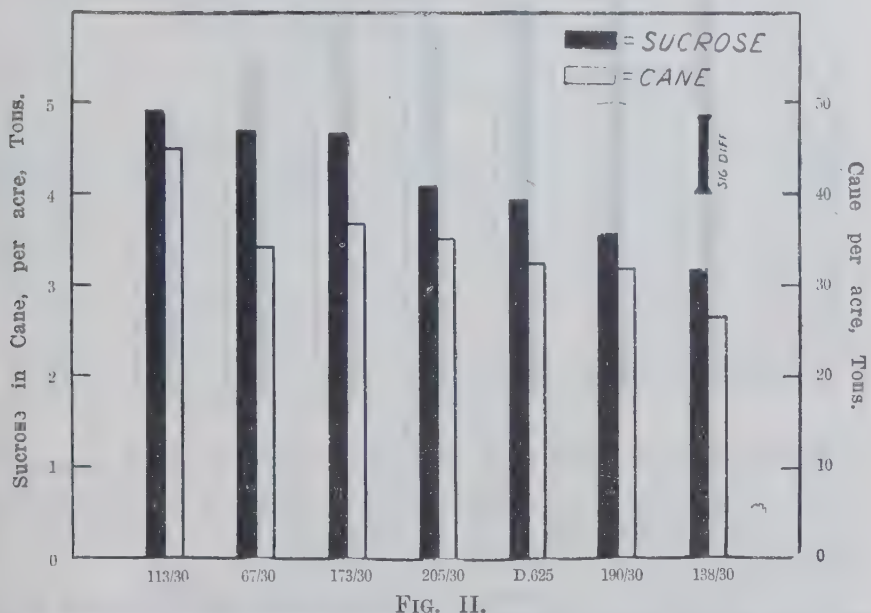

FIG. II.

Sucrose and Cane Yields from Field 11E., (B), Sophia (Plant Canes).

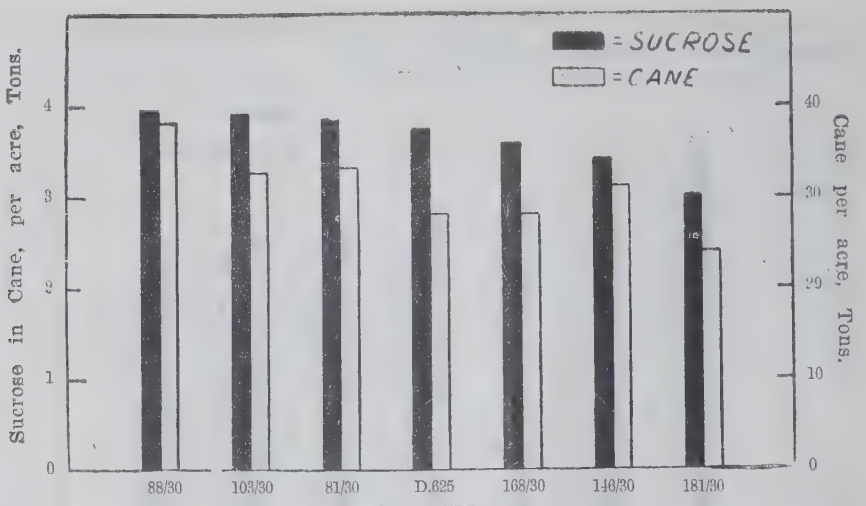

FIG. III.

Sucrose and Cane Yields from Field 11E., (C), Sophia (Plant Canes).

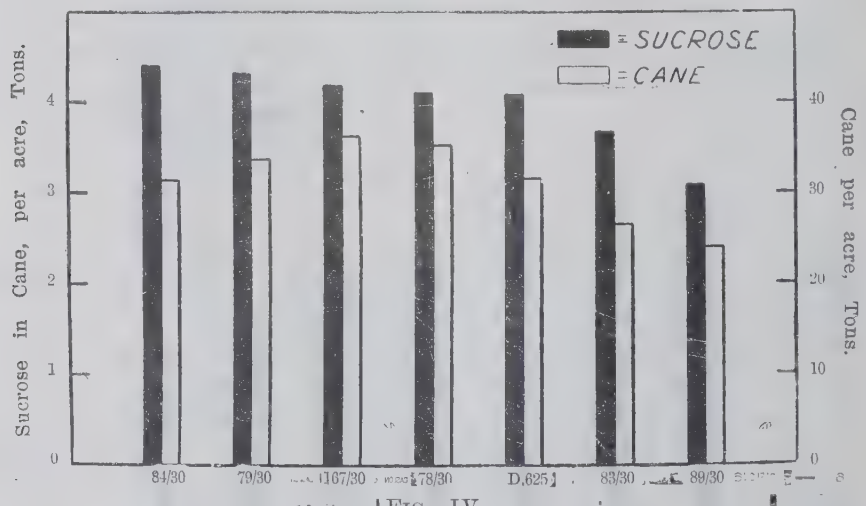

FIG. IV.

Sucrose and Cane Yields from Field 11E., (D), Sophia (Plant Canes).

From Experiment A, the varieties D. 171/29, D. 404/17 and D. 87/27 have been selected for further trial. D. 171/29, a seedling of P. O. J. 2725, yields heavy tonnages; much will depend on its juice characteristics.

From Experiment B, the varieties D. 113/30, D. 67/30, D. 173/30 and D. 205/30 have been selected for further trial. D. 113/30 (parents D. 238/17 x S. C. 12/4)

gave an unusually high yield of cane for Sophia. The juice purity and glucose ratio were, however, unsatisfactory. D. 67/30 (parents Diamond 10 x S. C. 12/4) and D. 173/30 (parent D. 145) gave good cane yields and showed satisfactory juice characteristics.

From Experiment C, the varieties D. 88/30, D. 103/30 and D. 81/30 have been selected for further trial.

From Experiment D, the varieties D. 84/30, D. 79/30, D. 167/30 and D. 78/30 have been selected for further trial. The first-named (parents Badila x D. 625) shows good juice qualities.

The total rainfall on the experiments in Field 11 East exceeded the average by 16.03 in., but this must all be attributed to the 'flood' months of December 1933 and January 1934. For eleven out of fifteen months the precipitation was subnormal.

The topsoil of Field 11 East is a slightly alkaline clay overlying a neutral clay. The organic matter content is below the average. The carbon : nitrogen ratio is normal, but salinity is below the average. The theoretical lime requirements for both the topsoil and subsoil are low.

TABLE III.—**Results of 2 Variety Trials in Field 12 East, Sophia.**

PLANTS, 14.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre.	
						Tons.	% Mean.
			Experiment		**A.**		
MEAN YIELDS:	D. 203/20	44.63	11.22	7.56	85.9	5.01	105.25
	D. 684/21	43.60	11.29	14.74	82.4	4.89	102.73
	D. 625	37.52	12.51	7.86	86.5	4.71	98.95
	D. 6/21	43.18	10.82	14.14	80.7	4.64	97.48
	D. 666/18	40.87	11.20	10.34	83.8	4.57	96.01
	Mean:					4.76	100.00
	Standard Error:					—	—
	Significant Difference, 20 : 1:					—	—
			Experiment		**B.**		
MEAN YIELDS:	<> 10	38.88	14.24	5.43	89.3	5.52	124.89
	D. 154/28	35.18	13.08	6.08	87.9	4.60	104.07
	D. 9/28	32.14	13.31	6.04	89.6	4.27	96.61
	D. 1/28	32.57	12.47	7.26	86.4	4.05	91.63
	D. 10/28	28.87	12.60	7.97	85.5	3.64	82.35
	Mean:					4.42	100.00
	Standard Error:					0.19	4.30
	Significant Difference, 20 : 1:					0.60	13.57

The results of the two trials in Field 12 East, Sophia, are recorded in Table III and graphically presented in Figures V and VI.

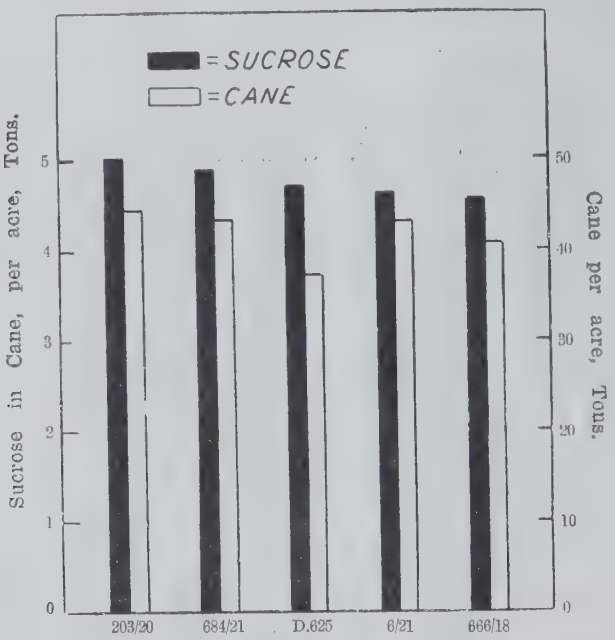

FIG. V.

Sucrose and Cane Yields from Field 12E., (A), Sophia (Plant Canes).

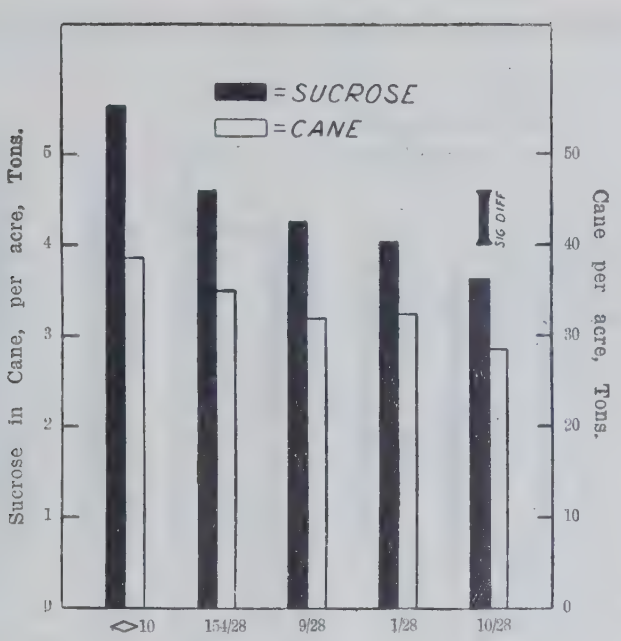

FIG. VI.

Sucrose and Cane Yields from Field 12E., (B), Sophia (Plant Canes).

Experiment A was designed to yield further information about four varieties which though known to produce heavy cane crops, frequently yield inferior juice. It will be seen that, as plant canes, D. 203/20 (parent D. 145) gave not only the highest tonnage in the experiment, but showed juice qualities and sucrose content most nearly approximately to those of the standard cane (D. 625). This trial will be carried through three crops.

In Experiment B, none of the other seedlings came reasonably near Diamond 10, the variety chosen as a standard.

Field 12 East, Sophia, experienced the same rainfall conditions as have just been described for Field 11 East, Sophia.

The soil and subsoil of Field 12 East are both slightly acidic clays. The organic matter content of the topsoil is low and the carbon : nitrogen ratio narrow. The theoretical lime requirement is low and salinity is below the average in both soil and subsoil.

TABLE IV.—Results of 4 Variety Trials in Field 13 East, Sophia.

PLANTS, 15.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
				Experiment	**A.**		
MEAN YIELDS:	D. 151/30	35.79	12.53	7.47	87.9	4.46	125.28
	D. 625	31.35	13.52	6.06	87.5	4.24	119.10
	D. 224/30	32.88	12.20	7.27	86.8	4.02	112.92
	D. 220/30	27.26	12.42	5.67	87.5	3.38	94.94
	D. 230/30	23.45	13.03	6.84	88.6	3.06	85.95
	D. 157/30	25.06	12.23	5.87	88.5	3.06	85.95
	D. 231/30	23.53	11.58	6.84	85.5	2.73	76.69
	Mean:					3.56	100.00
	Standard Error:					0.25	7.02
	Significant Difference, 20: 1:					0.81	22.75
				Experiment	**B.**		
MEAN YIELDS:	D. 150/30	37.12	13.32	6.72	89.7	4.96	111.96
	D. 147/30	35.11	13.44	7.12	88.7	4.72	106.55
	D. 625	37.11	12.73	13.65	85.7	4.69	105.87
	D. 142/30	35.08	12.94	8.01	86.8	4.53	102.26
	D. 149/30	33.72	13.19	7.34	89.5	4.44	100.23
	D. 148/30	31.36	12.60	7.30	88.9	3.97	89.62
	D. 87/30	28.80	12.94	6.86	88.4	3.72	83.97
	Mean:					4.43	100.00
	Standard Error:					0.27	6.09
	Significant Difference, 20: 1:					0.88	19.86
				Experiment	**C.**		
MEAN YIELDS:	D. 170/30	38.13	11.80	9.03	84.8	4.50	114.21
	D. 232/30	33.05	13.08	5.36	89.3	4.33	109.90
	D. 75/30	35.18	12.08	13.37	84.4	4.19	106.35
	D. 74/30	28.58	13.48	7.03	88.2	3.86	97.97
	D. 71/30	29.49	12.86	7.43	88.6	3.78	95.94
	D. 625	28.34	12.89	8.62	86.0	3.64	92.39
	D. 72/30	24.13	13.61	11.71	86.2	3.27	82.99
	Mean:					3.94	100.00
	Standard Error:					—	—
	Significant Difference, 20: 1:					—	—
				Experiment	**D.**		
MEAN YIELDS:	D. 235/30	37.30	11.69	9.74	85.7	4.36	111.22
	D. 625	31.86	13.16	10.60	86.8	4.20	107.14
	D. 223/30	32.02	12.79	7.61	88.4	4.09	104.34
	D. 221/30	33.12	12.14	7.53	87.5	4.03	102.81
	D. 222/30	34.34	11.61	10.36	84.6	3.99	101.79
	D. 237/30	27.46	13.04	8.55	85.8	3.58	91.33
	D. 236/30	26.50	11.98	7.48	85.6	3.18	81.12
	Mean:					3.92	100.00
	Standard Error:					0.17	4.34
	Significant Difference, 20: 1:					0.56	14.29

Table IV and Figures VII to X show the results obtained from the four trials in Field 13 East, Sophia.

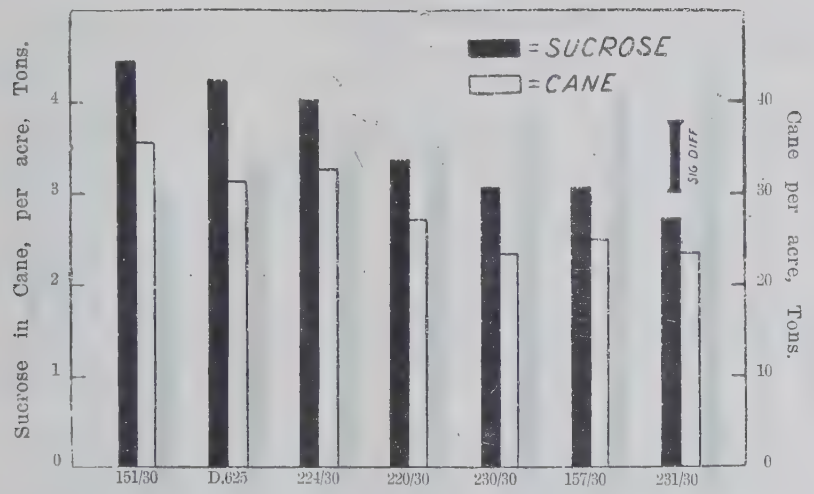

FIG. VII.

Sucrose and Cane Yields from Field 13E., (A), Sophia (Plant Canes).

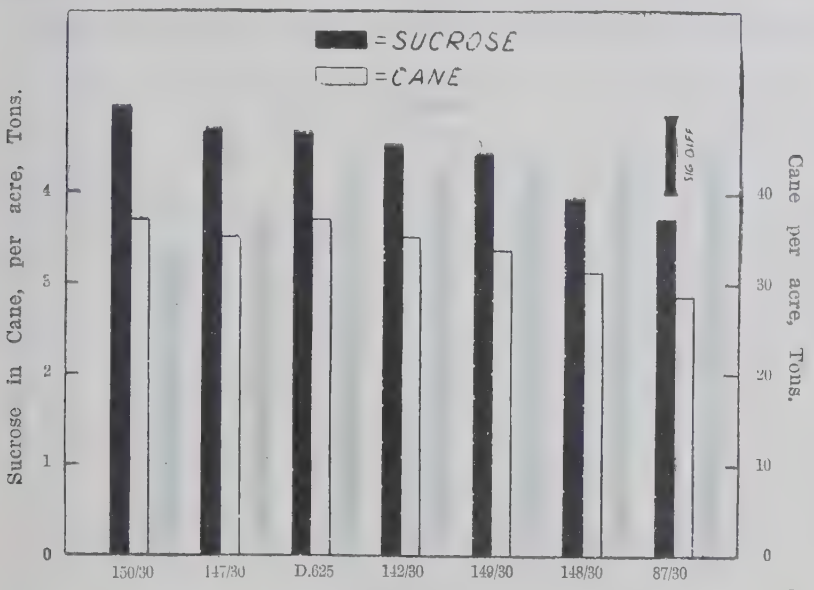

FIG. VIII.

Sucrose and Cane Yields from Field 13E., (B), Sophia (Plant Canes).

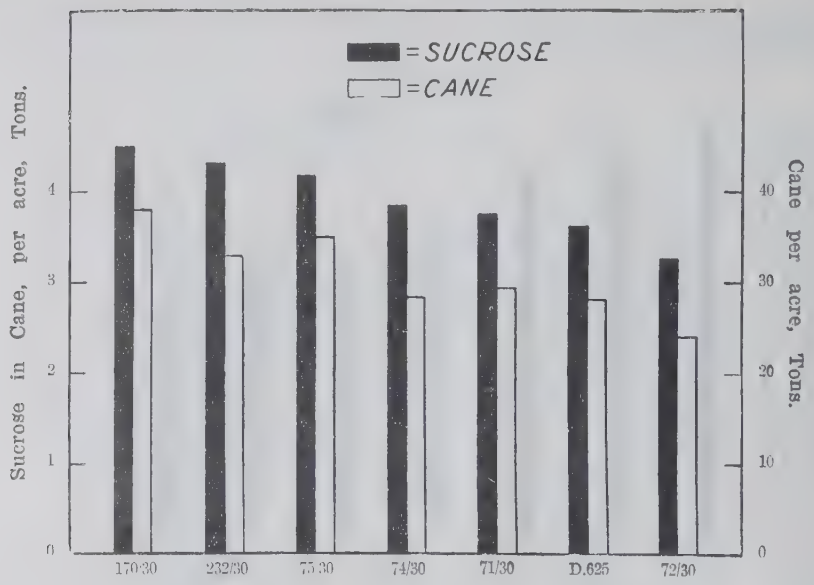

FIG. IX.

Sucrose and Cane Yields from Field 13E., (C), Sophia (Plant Canes).

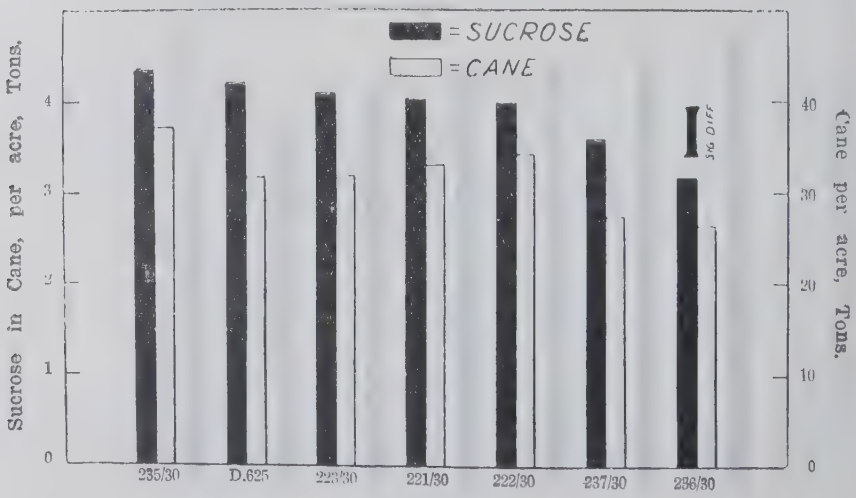

FIG. X.

Sucrose and Cane Yields from Field 13E., (D), Sophia (Plant Canes).

D. 151/30 (parents D. 625 x S.C. 12/4) is the only cane selected for further trial from Experiment A.

From Experiment B, the varieties D. 150/30 and D. 147/30 have been selected for further experimentation. Their sucrose contents and juice purities are above the average. Both are seedlings of the cross D. 625 x S.C. 12/4.

From Experiment C, D. 170/30, D. 232/30, D. 75/30, D. 74/30 and D. 71/30 have been selected. D. 170/30 (parent D. 145) gave ten tons of cane per acre more than the standard variety, D. 625.

Experiment D only yielded one cane worthy of further trial, *viz.*, D. 235/30 (parent S.C. 12/4).

Field 13 East, Sophia, was reasonably well watered for the first eight months of growth, but from February to September 1934 the monthly rainfall was always subnormal.

The soil of Field 13 East is a markedly acidic clay. It overlies a slightly acidic clay subsoil. The organic matter content is normal but the carbon : nitrogen ratio is slightly above the average. The theoretical lime requirement and salinity of both the soil and subsoil are below the average.

TABLE V.—**Results of 4 Variety Trials in Field 16 East, Sophia.**

PLANTS, 15.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
			Experiment A.				
MEAN YIELDS:	D. 66/30	33.21	13.59	4.95	90.6	4.53	136.04
	D. 39/30	27.89	13.70	5.99	91.7	3.80	114.11
	D. 51/30	29.50	12.29	7.70	89.2	3.63	109.01
	D. 625	26.68	12.97	9.87	85.8	3.48	104.50
	D. 62/30	22.70	13.98	5.57	91.4	3.18	95.50
	D. 36/30	26.15	10.56	13.13	82.3	2.77	83.18
	D. 5/30	16.70	11.26	8.92	84.6	1.89	56.76
	Mean:					3.33	100.00
	Standard Error:					0.32	9.61
	Significant Difference, 20: 1:					1.04	31.23
			Experiment B.				
MEAN YIELDS:	D. 49/30	42.77	13.48	5.59	90.2	5.77	133.26
	D. 747/13	37.64	12.45	8.31	87.6	4.69	108.31
	D. 52/30	32.27	13.09	6.45	87.7	4.25	98.15
	D. 57/27	35.78	11.39	8.00	82.7	4.08	94.23
	D. 625	31.55	12.91	7.68	86.2	4.05	93.53
	D. 8/30	32.79	11.65	5.97	87.3	3.81	87.99
	D. 48/30	28.62	12.84	6.10	88.2	3.67	84.76
	Mean:					4.33	100.00
	Standard Error:					0.36	8.31
	Significant Difference, 20: 1:					1.17	20.72
			Experiment C.				
MEAN YIELDS:	D. 164/30	37.22	13.93	5.62	91.0	5.17	115.92
	D. 165/30	37.63	13.46	5.55	90.7	5.07	113.68
	D. 625	38.27	12.71	8.50	86.5	4.86	108.97
	D. 160/30	34.61	13.56	6.16	90.8	4.69	105.16
	D. 174/30	32.76	13.38	5.14	89.2	4.38	98.21
	D. 143/30	27.25	13.24	5.22	90.9	3.63	81.39
	D. 152/30	24.74	13.84	6.10	90.5	3.43	76.91
	Mean:					4.46	100.00
	Standard Error:					0.37	8.30
	Significant Difference, 20: 1:					1.22	27.35
			Experiment D.				
MEAN YIELDS:	D. 625	40.86	13.32	7.69	89.2	5.44	114.53
	D. 182/30	42.58	12.70	8.19	87.9	5.38	113.26
	D. 178/30	39.87	13.29	8.37	89.0	5.29	111.37
	D. 3/30	37.89	12.14	12.74	85.0	4.61	97.05
	D. 41/30	39.52	11.09	15.08	84.9	4.37	92.00
	D. 142/30	32.21	13.17	5.91	86.9	4.20	88.42
	D. 1/30	30.75	12.95	7.45	86.8	3.97	83.58
	Mean:					4.75	100.00
	Standard Error:					0.34	7.16
	Significant Difference, 20: 1:					1.10	23.16

The results obtained from the four experiments in Field 16 East, Sophia, are recorded in Table V and shown graphically in Figures XI to XIV.

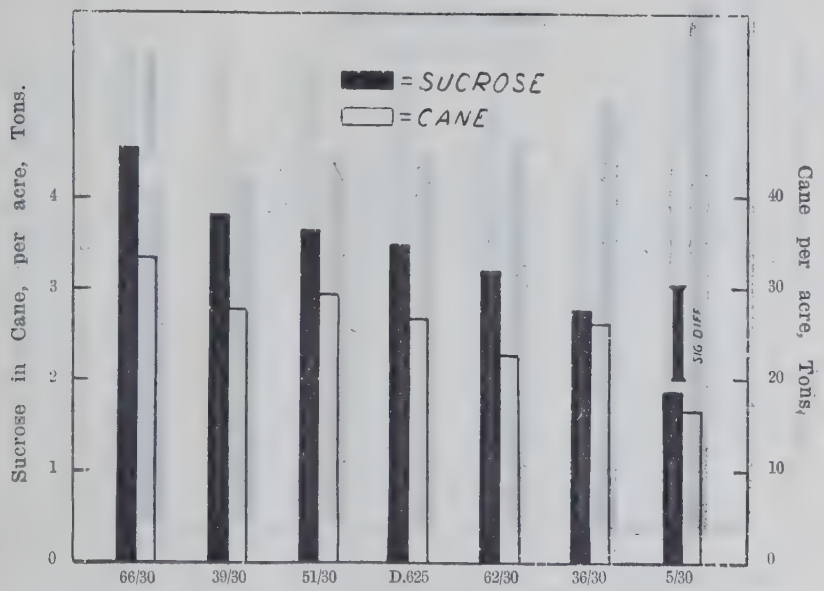

FIG. XI.

Sucrose and Cane Yields from Field 16E., (A), Sophia (Plant Canes).

In Experiment A, D. 66/30, D. 39/30 and D. 51/30 did sufficiently well to merit further attention. D. 66/30 (parents Diamond 10 x S.C. 12/4) gave the highest tonnage in this trial and also showed very satisfactory juice qualities. Preliminary observations in the nurseries indicate that this cane ratoons well. D. 39/30 (parents D. 238/17 x S.C. 12/4) also showed very good juice characteristics.

In Experiment B, D. 49/30 (parent D. 625) distinguished itself by a cane yield five tons per acre above its nearest rival, and by showing the best juice characteristics in the trial. D. 747/13, D. 52/30 and D. 57/27 have also been retained for further testing.

Two seedlings of D. 145, *viz.*, D. 164/30 and D. 165/30 have been retained among the batch tested in Experiment C.

No cane in Experiment D surpassed the yield of the standard cane, D. 625.

Field 16 East, Sophia, experienced the same rainfall as Field 13 East, and the remarks made on this subject, in discussing the experiments in the latter field, apply here.

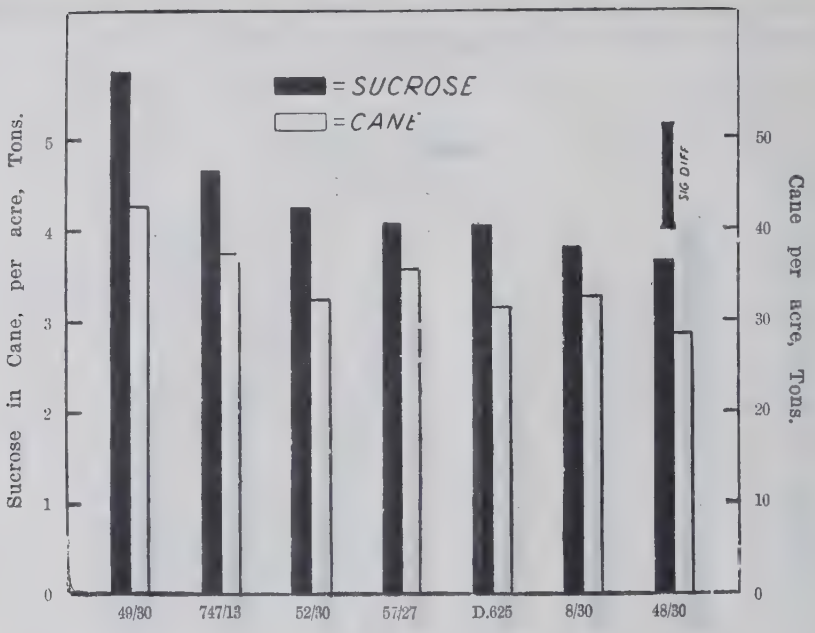

FIG. XII.

Sucrose and Cane Yields from Field 16E., (B), Sophia (Plant Canes).

The slightly acidic clay topsoil of Field 16 East, Sophia, overlies an alkaline subsoil of similar texture. The carbon : nitrogen ratio is normal but the organic matter content is below the average. The salinity of both the soil and subsoil is high. The theoretical lime requirement is low,

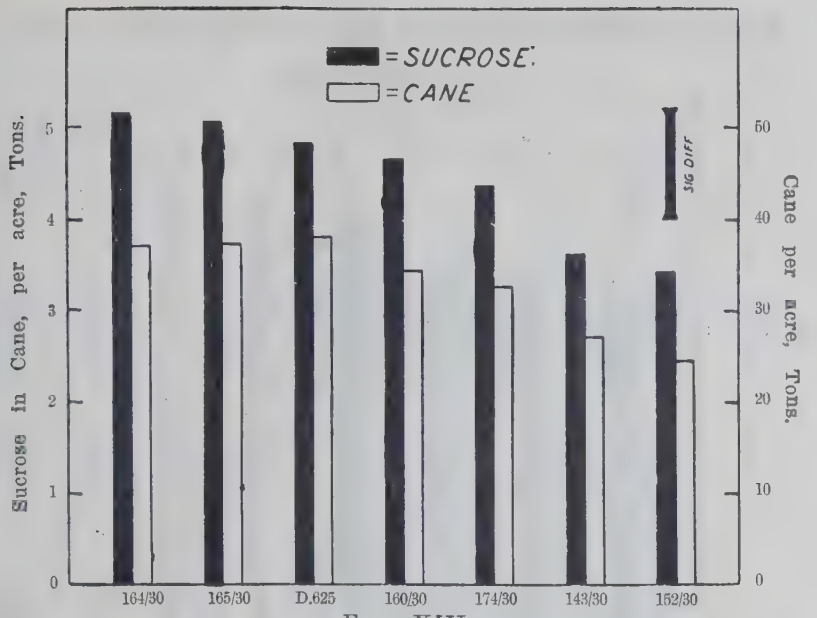

FIG. XIII.

Sucrose and Cane Yields from Field 16E., (C), Sophia (Plant Canes).

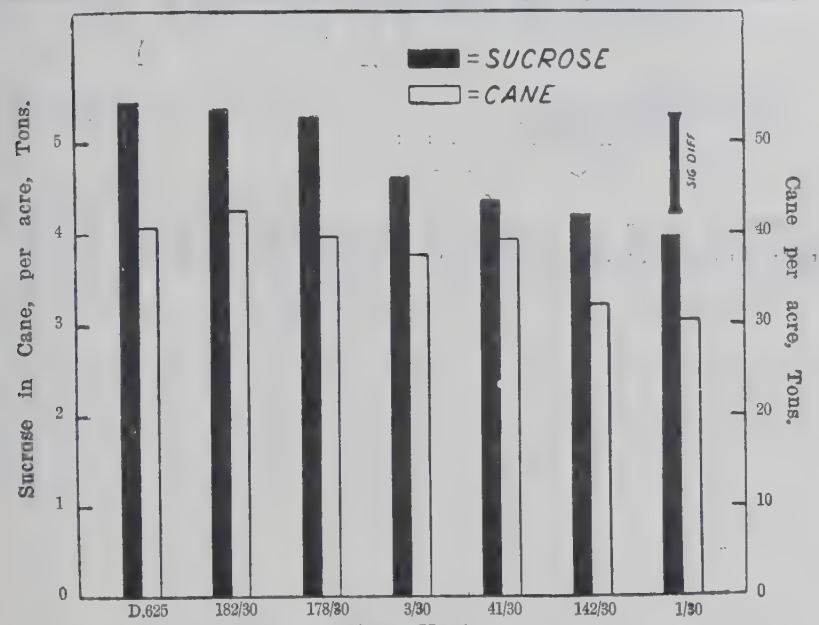

FIG. XIV.

Sucrose and Cane Yields from Field 16E., (D), Sophia (Plant Canes).

TABLE VI.—Results of 2 Variety Trials in Field 6 West, Sophia.

PLANTS, 11.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,	
						Tons.	% Mean.
			Experiment		**A.**		
MEAN YIELDS:	D. 625	39.67	14.10	9.10	86.9	5.58	119.23
	D. 50/30	35.38	14.53	4.51	90.6	5.13	109.62
	D. 43/30	37.99	13.16	8.75	87.4	5.01	107.05
	D. 64/30	29.56	14.97	6.62	89.2	4.43	94.66
	D. 54/30	30.88	13.94	5.28	89.3	4.30	91.88
	D. 63/30	24.91	14.62	4.79	91.1	3.64	77.78
	Mean:					4.68	100.00
	Standard Error:					0.16	3.42
	Significant Difference, 20 : 1:					0.47	10.04
			Experiment		**B.**		
MEAN YIELDS:	D. 625	44.54	14.09	10.06	86.5	6.29	133.55
	D. 10/30	36.90	13.69	4.83	89.4	5.06	107.43
	D. 7/30	38.24	13.07	5.57	87.7	4.98	105.73
	D. 14/30	35.20	13.38	5.86	87.7	4.71	100.00
	D. 13/30	29.84	13.85	4.52	90.6	4.13	87.69
	D. 45/30	24.55	12.57	9.07	86.1	3.10	65.82
	Mean:					4.71	100.00
	Standard Error:					0.26	5.52
	Significant Difference, 20 : 1:					0.77	16.35

Table VI shows the results from the two plant cane trials in Field 6 West, Sophia; they are graphically illustrated in Figures XV and XVI.

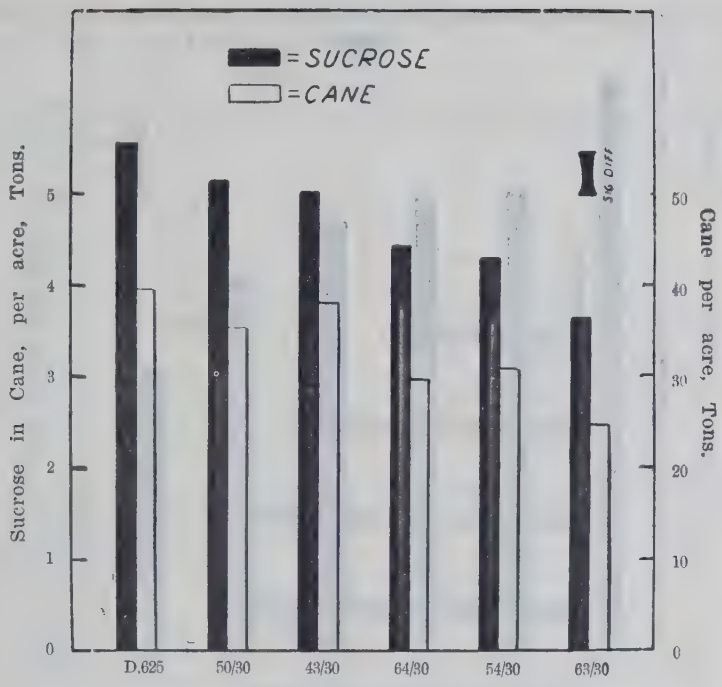

FIG. XV.

Sucrose and Cane Yields from Field 6W., (A), Sophia (Plant Canes).

It will be seen that in both experiments the standard cane, D. 625, has outyielded all the new seedlings.

Rainfall was very deficient during the growth period. The total precipitation was 26.30 in. below the average. The canes were, however, irrigated five times and it is believed that this accounts for the satisfactory tonnages.

The topsoil of Field 6 West, Sophia, is a slightly acidic clay overlying an alkaline subsoil. In the former the amount of organic matter present is below the average, but, in the latter, is above. The carbon : nitrogen ratio is wide. The soils are of average salinity, and while the theoretical lime requirement of the topsoil is above the average, that of the subsoil is low.

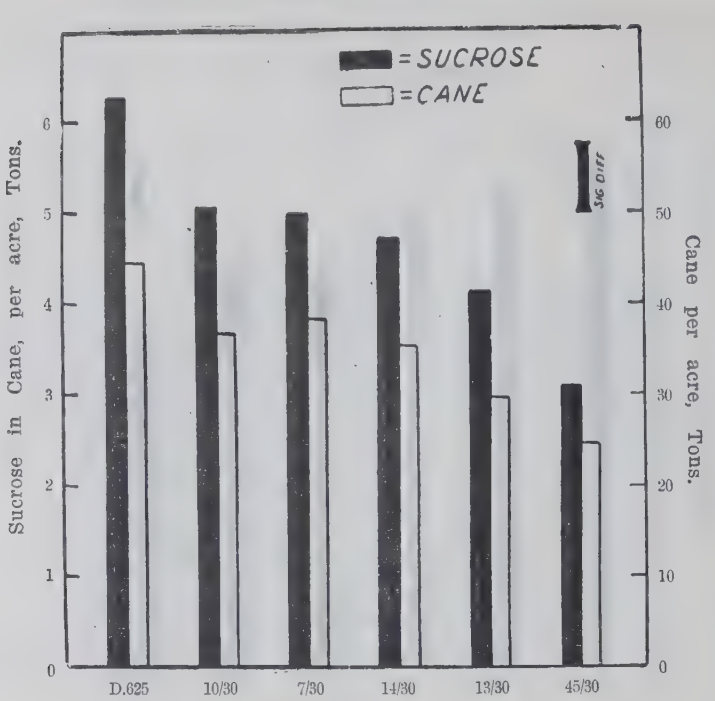

FIG. XVI.

Sucrose and Cane Yields from Field 6W., (B), Sophia (Plant Canes).

TABLE VII.—Results of a Variety Trial in Field 13 West, Sophia.

PLANTS, 12.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
MEAN YIELDS:	D. 625	36.30	13.55	10.14	85.5	4.91	129.89
	D. 218/30	33.19	13.00	7.31	86.8	4.30	113.76
	D. 136/30	35.87	11.83	11.64	84.1	4.24	112.17
	D. 47/30	28.65	14.31	6.49	88.4	4.12	108.99
	D. 215/30	28.32	13.74	6.22	87.8	3.90	103.17
	D. 154/28	27.23	13.80	5.30	87.7	3.76	99.47
	D. 31/30	27.90	13.25	8.68	85.0	3.69	97.62
	D. 2/30	28.00	12.63	10.71	83.9	3.53	93.38
	D. 179/30	25.99	12.32	8.53	85.3	3.19	84.39
	D. 46/30	18.00	11.96	8.33	84.6	2.18	57.67
	Mean:					3.78	100.00
	Standard Error:					0.21	5.56
	Significant Difference, 20 : 1 :					0.60	15.87

Table VII and Figure XVII show the results obtained from the variety trial in Field 13 West, Sophia.

The standard cane, D. 625, proved better than any of the new varieties tried in this experiment.

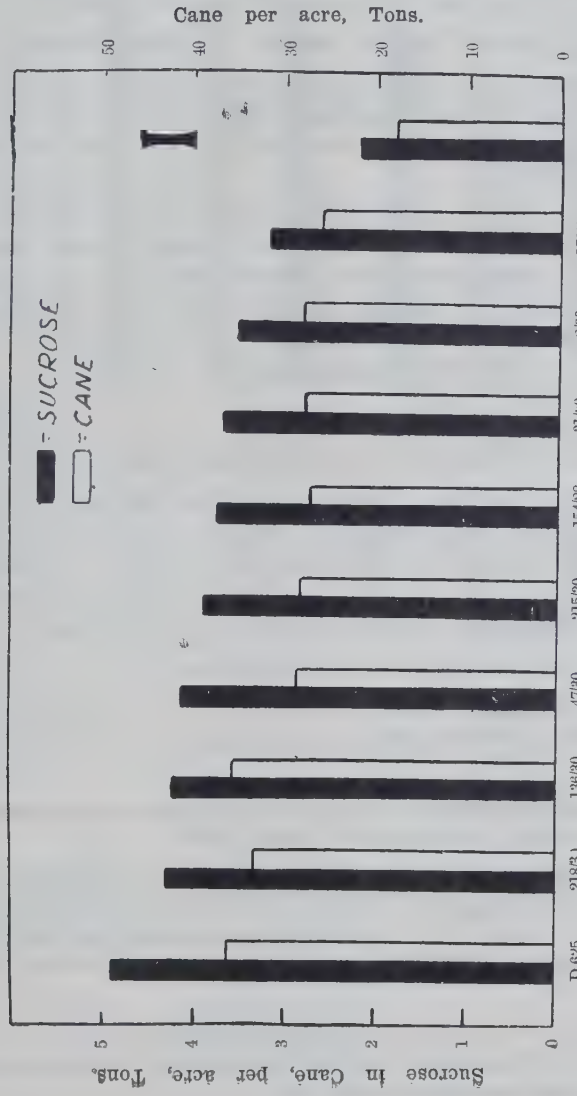

FIG. XVII.

Sucrose and Cane Yields from Field 13W., Sophia (Plant Canes).

This trial experienced a marked shortage of rain, the total deficit from the average being 25.53 in.

The topsoil of Field 13 West is a markedly acidic mixture of clay and silt overlying a slightly acidic clay subsoil. The organic matter content is below normal but the carbon : nitrogen ratio is above the average. The theoretical lime requirement is normal, the salinity of the topsoil above the average.

Plant Cane Variety Trials Reaped in East Demerara.

The only plant cane variety trial reaped in East Demerara during the period was situated in Field 22 C.M., at Pln. La Bonne Intention. Set out as a 6 x 6 latin square, the experiment was planted on 25. VIII. 1933 and reaped on 3.XI. 1934, when 14.25 months old.

Detailed figures of the monthly rainfall (actual and average) and of the results of the laboratory examination of the soil and subsoil from the experimental site, are recorded in Appendices I and II, respectively.

Table VIII.—**Results of a Variety Trial in Field 22 C.M., La Bonne Intention.**

Plants. 14.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,	
						Tons.	% Mean.
Mean Yields:	P.O.J.2878	39.19	14.23	4.75	86.9	5.57	138.21
	D. 11/28	34.16	12.07	7.18	84.9	4.13	102.48
	D. 625	33.06	11.96	12.35	82.4	3.94	97.77
	D. 684/21	37.12	10.48	15.00	75.6	3.88	96.28
	<> 10	25.99	13.95	6.31	86.5	3.61	89.58
	D. 1159/22	25.81	11.94	8.15	82.8	3.08	76.43
	Mean:					4.03	100.00
	Standard Error:					0.17	4.22
	Significant Difference, 20 : 1 :					0.53	13.15

The results of the trial in Field 22 C.M., Pln. La Bonne Intention, are recorded in Table VIII and shown graphically in Figure XVIII.

P.O.J. 2878 led all the other varieties in the trial by a wide margin, registering not only the highest tonnage but the highest sucrose content and juice purity and the lowest glucose ratio. D. 11/28, which came second, leading D. 625 by 4.7 per cent. and Diamond 10 by 12.90 per cent., is a product of the cross S.C. 12/4 x D. 625.

During the third to the fifth month of growth this trial received an excess of 38.64 in. rainfall above the average, but from the sixth to the thirteenth month, inclusive, the rainfall was consistently subnormal.

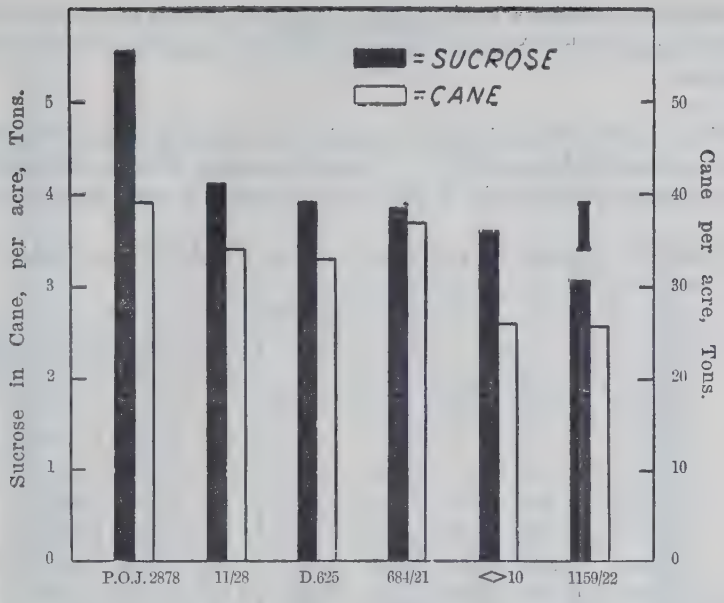

FIG. XVIII.

Sucrose and Cane Yields from Field 22C.M., La Bonne Intention (Plant Canes).

Both the soil and subsoil of Field 22 C.M. are highly acidic clays. The organic matter content is above the average for this type of soil but the carbon : nitrogen ratio is narrow. The theoretical lime requirement is high and the salinity low.

SUB-SECTION B.—FIRST RATOON VARIETY TRIALS.

FIRST RATOON VARIETY TRIALS REAPED AT SOPHIA EXPERIMENT STATION.

Details of the first ratoon variety trials reaped at the Sophia Experiment Station during the period are presented in Table IX.

TABLE IX.

First Ratoon Variety Trials Reaped at Sophia Experiment Station.

Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
		Previous Reaping.	Reaping.	Varieties.	Replicates.	
1 East	12.75	5.IX.33	28.IX.34	8	8	Latin Square.
1 West	12.75	7.IX.33	1.X.34	4	8	Randomised Blocks.
2 „	12.50	20.IX.33	2. X.34	5	9	„
10 „	14.25	22.IX.33	27.XI.34	7	10	„
11 „	12.75	12.III.34	3.IV.35	7	10	„
16 „	12.75	13.III.34	1.IV.35	9	7	„

Reference to Appendix I will furnish detailed records of the actual rainfall during the course of the experiments together with a comparison with the normal precipitation.

Detailed results of the laboratory examination of soil samples from the trial sites are presented in Appendix II. A brief discussion of these data has already been given (*Sugar Bulletin* No. 3, pp. 2–14) in reporting the plant cane yields.

TABLE X.—**Results of a Variety Trial in Field 1 East, Sophia.**

	1st Ratoons, 12.75 months.								
	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields:	<> 10	32.08	13.10	6.34	85.8	4.20	137.70	<> 10	8.52
	P.O.J. 2878	27.04	13.27	5.63	84.4	3.58	117.38	P.O.J. 2878	7.67
	D. 663/13	29.23	11.38	10.00	81.7	3.32	108.85	D. 602/22	6.92
	D. 625	23.79	12.05	8.96	82.2	2.88	94.43	D. 663/13	6.69
	D. 602/22	23.21	12.10	6.13	83.0	2.82	92.46	D. 625	6.44
	Berbice	23.10	11.69	7.24	82.1	2.71	88.85	D. 195/17	6.34
	D. 195/17	20.61	12.87	8.70	82.7	2.65	86.89	D. 6/21	6.34
	D. 6/21	25.17	9.14	20.33	71.9	2.26	74.10	Berbice	6.30
	Mean:					3.05	100.00		
	Standard Error:					0.16	5.25		
	Significant Difference, 20: 1:					0.49	16.07		

(*Plant cane results reported in Sugar Bull. No. 3, p. 14.*)

Table X shows the results obtained from the variety trial in Field 1 East, Sophia. The combined results for the plant cane and first ratoon crop are recorded graphically in Figure XIX.

In this field, Diamond 10 has outyielded P.O.J. 2878 as a first ratoon by 20 per cent. The Java cane, however, surpassed the standard cane, D. 625, by 23 per cent. In the combined results for two crops, Diamond 10 leads with a total yield of 8.52 tons sucrose in cane per acre, followed by P.O.J. 2878 with 7.67 tons sucrose. D. 625 is fifth in the list, with a yield of 6.44 tons sucrose. The juice characteristics of Diamond 10 and P.O.J. 2878 were superior to those of D. 625.

Rainfall for the first two months of growth was just below normal. Then during the period of the floods (November 1933 to January 1934) it was excessive,

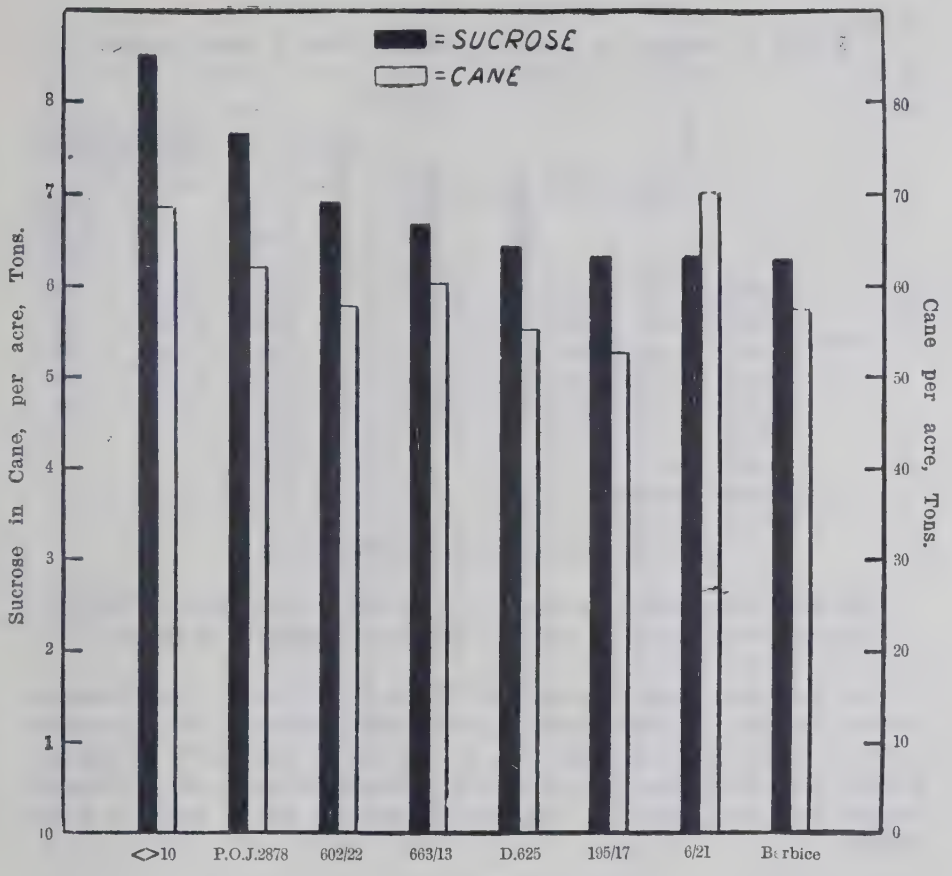

FIG. XIX.

Sucrose and Cane Yields from Field 1E., Sophia (Plant Canes and First Ratoons).

For the last eight months of the growth period precipitation was consistently below the normal.

The slightly acid heavy silt soil of Field 1 East, Sophia, has been discussed on page 14 of *Sugar Bulletin* No. 3.

TABLE XI.—**Results of a Variety Trial in Field 1 West, Sophia.**

1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 880/21	20.52	13.13	6.56	86.8	2.69	109.80	D. 53/27	7.58
	D. 53/27	20.84	12.68	7.28	84.1	2.66	108.57	D. 625	7.39
	D. 625	20.59	12.83	8.09	85.3	2.63	107.35	D. 880/21	7.18
	D. 516/20	15.61	11.68	6.42	83.6	1.82	74.29	D. 516/20	5.42
	Mean:					2.45	100.00		
	Standard Error:					0.19	7.76		
	Significant Difference, 20: 1:					0.57	23.27		

(*Plant cane results reported in Sugar Bull. No. 3, p. 2.*)

The results obtained from Field 1 West, Sophia are recorded in Table XI, while the combined results for two crops are shown graphically in Figure XX.

The first ratoon yields here of D. 880/21 and D. 53/27 were very similar to those of D. 625. D. 516/20 appears to be definitely inferior. Considering the combined yields from the plant cane and first ratoon crops, it will be seen that D. 53/27 leads the standard cane by 0.19 ton sucrose in cane per acre. However, this cane is, on the whole, an unsatisfactory ratooner and its extension is not advised.

This experiment was subjected to the same rainfall conditions as the one in Field 1 East, just described.

A discussion of the markedly acid clay soil of Field 1 West, appeared on page 3 of *Sugar Bulletin* No. 3.

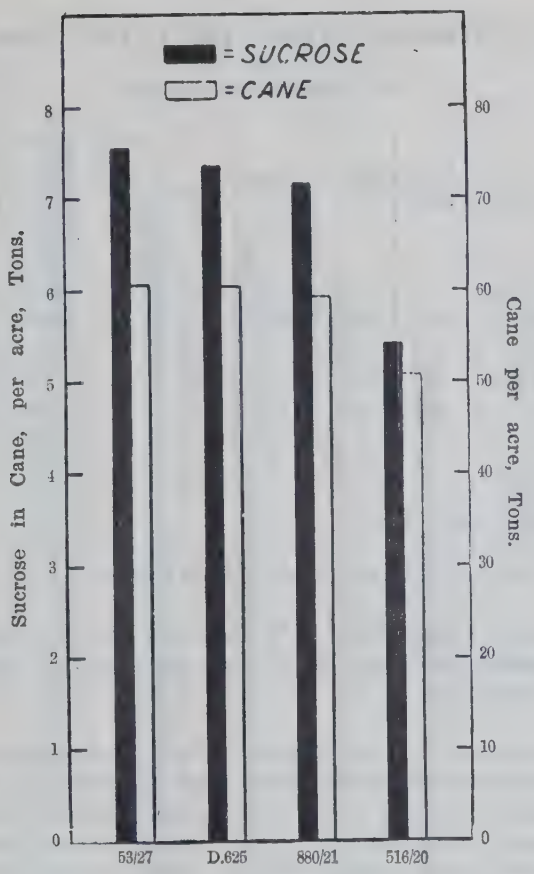

FIG. XX.

Sucrose and Cane Yields from Field 1W., Sophia (Plant Canes and First Ratoons).

TABLE XII.—**Results of a Variety Trial in Field 2 West, Sophia.**

1ST RATOONS, 12.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	Co. 213	34.51	12.27	5.87	83.9	4.24	125.82	Co. 213	9.03
	Co. 210	32.21	11.29	5.28	83.2	3.64	108.01	Co. 210	8.04
	Co. 281	25.74	12.73	3.37	85.0	3.27	97.03	Co. 281	7.72
	P.O.J. 253	25.98	12.19	4.52	85.6	3.15	93.47	P.O.J. 253	7.31
	D. 625	20.44	12.52	7.93	83.8	2.56	75.96	D. 625	6.29
	Mean:					3.37	100.00		
	Standard Error:					0.24	7.12		
	Significant Difference, 20: 1:					0.72	21.36		

(*Plant cane results reported in Sugar Bull. No. 3, p. 4.*)

The data secured from Field 2 West, Sophia, are given in Table XII, the combined sucrose and cane yields for the plant cane and first ratoon crops shown graphically in Figure XXI.

Co. 213, which came first as a plant cane, leads in the first ratoons by a wide margin and, in the combined results of two crops, surpasses its nearest rival by one ton of sucrose per acre and D. 625 by 2.7 tons. This cane has also done well in a trial on pegassy clay at Pln. Wales. The second ratoons of the trial in Field 2 West, Sophia, will not be reaped for it was decided to 'draw down' the Co. 213 and get it into several other trials as rapidly as possible.

The weather conditions experienced by this trial were identical with those affecting Field 1 East, Sophia, described on pages 24 and 25.

The markedly acid clay soil of Field 2 West, Sophia, was described on page 4 of *Sugar Bulletin* No. 3.

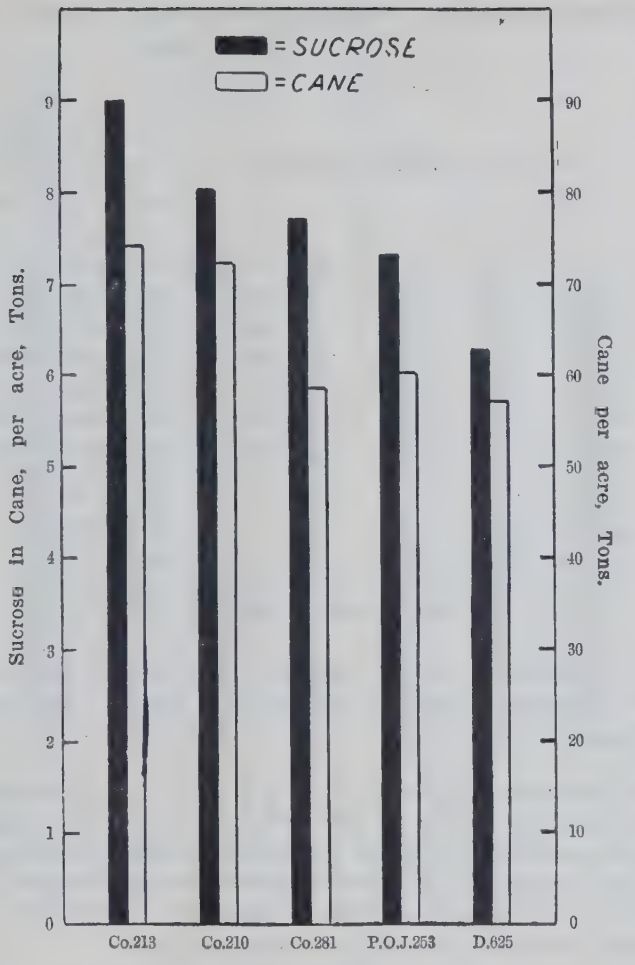

FIG. XXI.

Sucrose and Cane Yields from Field 2W., Sophia (Plant Canes and First Ratoons).

TABLE XIII.—**Results of a Variety Trial in Field 10 West, Sophia.**

1ST RATOONS, 14.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 11/28	20.04	13.12	3.89	87.6	2.63	145.30	D. 11/28	7.52
	D. 625	15.82	14.10	4.48	87.8	2.24	123.76	D. 625	6.42
	D. 3/28	14.19	12.14	4.57	85.1	1.71	94.48	D. 13/28	5.53
	D. 204/20	11.88	13.08	4.50	86.1	1.54	85.08	D. 204/20	5.36
	D. 24/28	11.80	12.80	3.93	87.9	1.52	83.98	D. 15/28	5.20
	D. 15/28	12.13	12.42	3.80	87.0	1.51	83.43	D. 3/28	5.18
	D. 13/28	11.45	13.05	4.53	85.3	1.50	82.87	D. 24/28	4.94
	Mean:					1.81	100.00		
	Standard Error:					0.13	7.18		
	Significant Difference, 20: 1:					0.40	22.10		

(*Plant cane results reported in Sugar Bull. No. 3, p. 7.*)

Table XIII records the results obtained from the trial in Field 10 West, Sophia. The combined results for the plant cane and first ratoon crops are presented in Figure XXII.

D. 11/28 (parents S.C. 12/4 x D. 625) led D. 625 by a wide margin in the first ratoons and by 1.11 tons sucrose in cane per acre in the combined results of the two crops. The record of D. 11/28 at Non Pareil, La Bonne Intention, Sophia and Uitvlugt is very promising. It has not done well at Port Mourant. None of the other canes calls for comment. Reaped rather late for first ratoons the juices from this field, even of D. 625, had low glucose ratios.

This field experienced marked excesses in rainfall from November 1933 to January 1934. For nine out of the remaining ten months of growth, rainfall was deficient.

The markedly acid clay soil of Field 10 West, Sophia, has been discussed on page 7 of *Sugar Bulletin* No. 3.

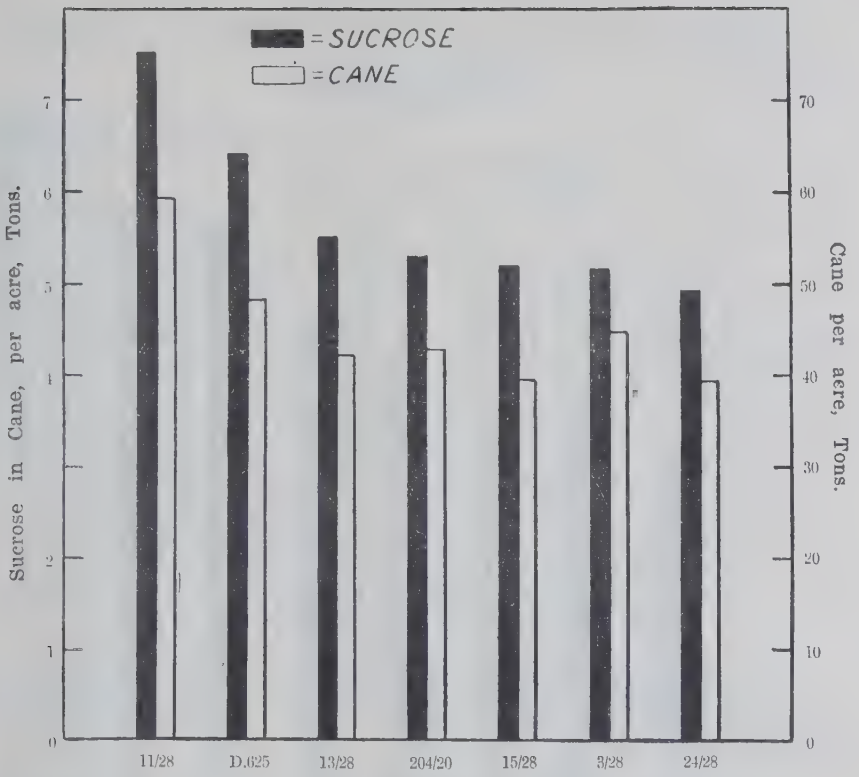

FIG. XXII.

Sucrose and Cane Yields from Field 10W., Sophia (Plant Canes and First Ratoons).

TABLE XIV.—**Results of a Variety Trial in Field 11 West, Sophia.**

1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 625	22.07	14.30	6.72	88.2	3.15	140.62	D. 625	7.03
	D. 404/17	22.01	13.94	4.44	88.8	3.08	137.50	D. 404/17	6.74
	D. 1221/22	17.52	13.12	5.20	87.6	2.30	102.68	D. 1221/22	5.71
	D. 1159/22	15.04	13.23	6.06	86.5	1.99	88.84	D. 1159/22	5.35
	D. 349/20	14.05	13.46	5.55	87.2	1.89	84.37	D. 349/20	4.72
	D. 438/21	12.83	13.46	4.64	87.4	1.73	77.23	D. 438/21	4.76
	D. 8/27	11.50	13.09	6.67	86.0	1.51	67.41	D. 8/27	4.24
	Mean:					2.24	100.00		
	Standard Error:					0.13	5.80		
	Significant Difference, 20: 1:					0.39	17.41		

(*Plant cane results reported in Sugar Bull. No. 3, p. 8.*)

The results of the experiment in Field 11 West, Sophia, are given in Table XIV. Figure XXIII shows graphically the combined results from the plant cane and first ratoon crops.

No variety in this trial has surpassed the standard cane which came first in both the plants and the first ratoons. D. 404/17 was second in both crops. The canes in this trial were apparently mature for purities and glucose ratios were satisfactory.

Field 11 West was unsatisfactorily watered. The rainfall was below the average for eleven out of thirteen months, with a total deficit of 26.14 in.

The markedly acid clay soil of this field has already been described on page 9 of *Sugar Bulletin* No. 3.

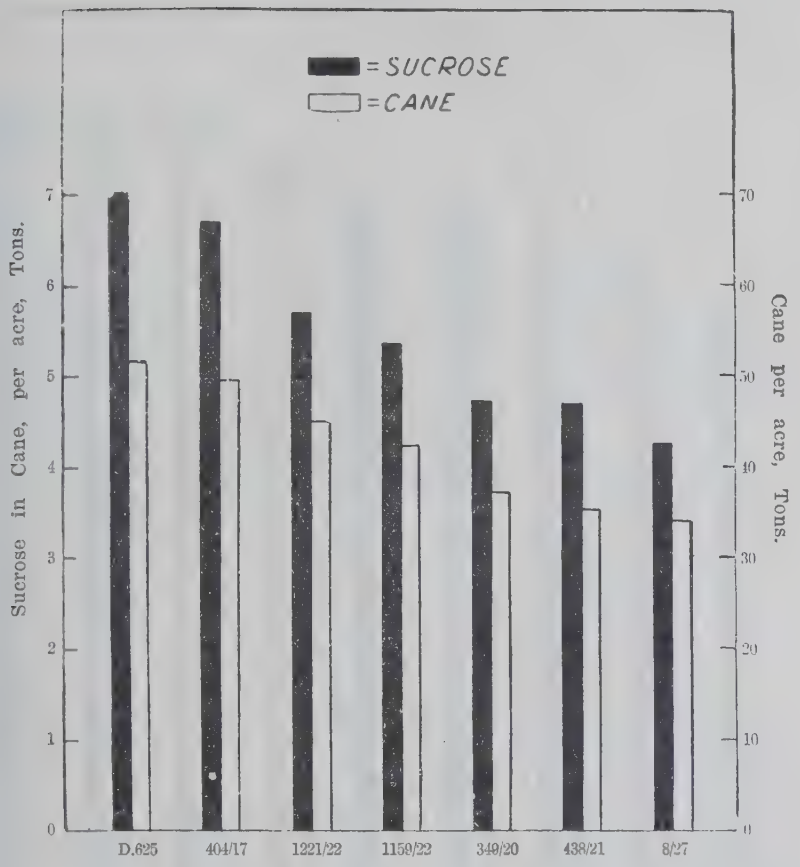

FIG. XXIII.

Sucrose and Cane Yields from Field 11W., Sophia (Plant Canes and First Ratoons).

TABLE XV.—**Results of a Variety Trial in Field 16 West, Sophia.**

1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 444/21	40.74	12.17	12.98	84.2	4.94	112.27	D. 444/21	10.38
	D. 207/20	38.87	12.41	5.62	87.3	4.82	109.55	D. 625	10.17
	D. 625	38.48	12.26	12.33	83.4	4.72	107.27	D. 207/20	10.06
	D. 895/22	37.01	12.54	7.73	86.1	4.62	105.00	D. 895/22	9.89
	D. 814/12	35.57	12.82	6.08	87.3	4.55	103.41	D. 1159/22	9.23
	D. 1159/22	33.19	13.04	7.12	85.5	4.30	97.73	D. 92/17	9.18
	D. 92/17	34.75	12.00	9.22	85.6	4.15	94.32	D. 814/12	8.96
	D. 349/20	29.97	12.77	7.55	85.6	3.82	86.82	D. 349/20	8.84
	D. 73/17	33.10	11.02	9.02	83.2	3.68	83.64	D. 73/17	8.14
	Mean:					4.40	100.00		
	Standard Error:					0.22	5.00		
	Significant Difference, 20: 1:					0.64	14.55		

(*Plant cane results reported in Sugar Bull. No. 3, p. 12.*)

Table XV records the data obtained from the first ratoon variety trial in Field 16 West, Sophia. The combined cane and sucrose yields for two crops are graphically compared in Figure XXIV.

D. 444/21, which came second in the plant canes, topped the list of the first ratoons with a yield of 40.74 tons of cane per acre. The first ratoon yield of cane was 92.4 per cent. of the plant cane yield. In the case of D. 625 the first ratoon yield of 38.48 tons of cane was 87.5 per cent. of the plant cane return. First ratoons of D. 625 usually average about 75.9 per cent. of the plant cane yield. Both as plants and as first ratoons D. 444/21 and D. 625 gave abnormally high glucose ratios. In the combined results for two crops, D. 444/21 leads D. 625 by a small margin.

This trial experienced similar rainfall conditions to those just described for the trial in Field 11 West. During the dry spell, however, this field had five irrigations as compared with three given Field 11 West. It is believed that these extra irrigations account for the high yield of the ratoons as compared with those from the plant canes.

The markedly acid fine silt soil of the trial site has been discussed on page 13 of *Sugar Bulletin* No. 3.

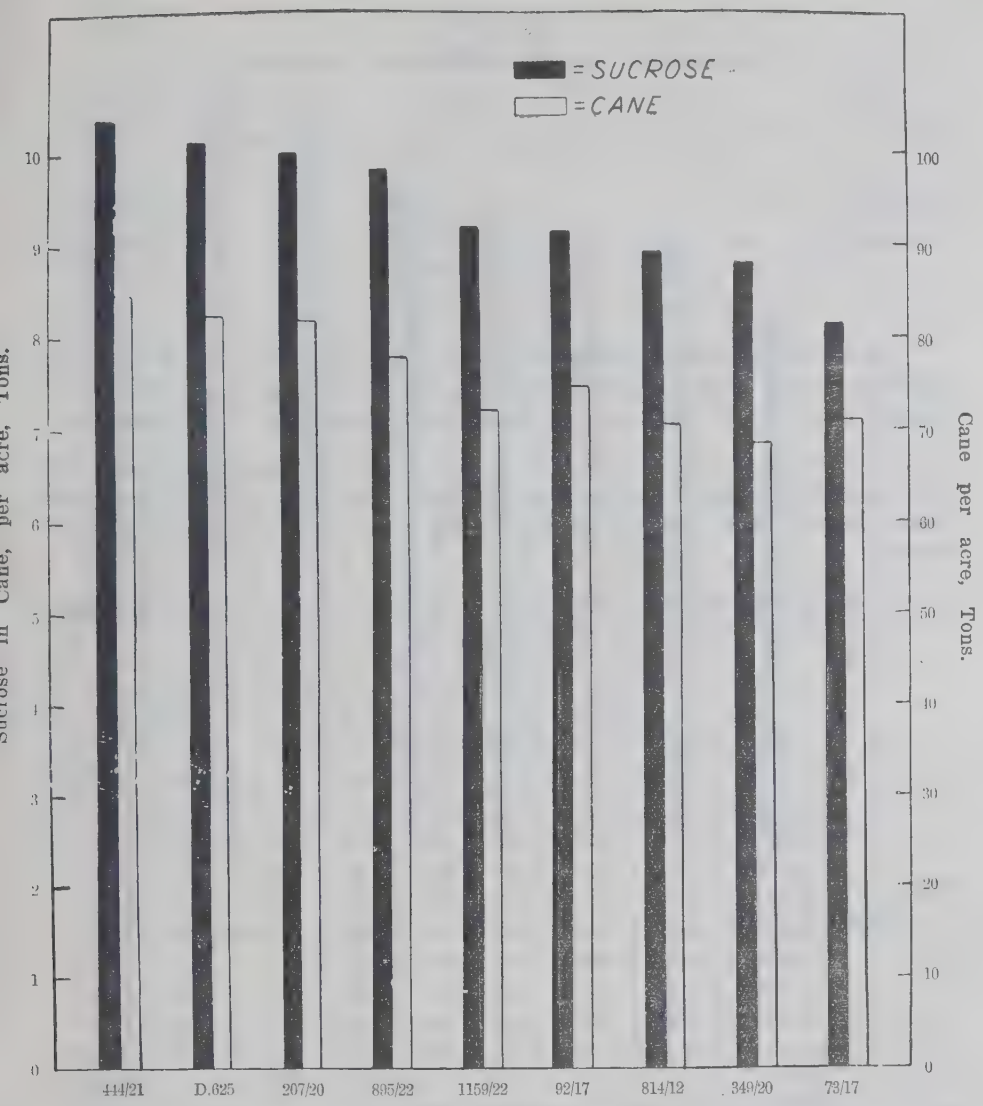

FIG. XXIV.

Sucrose and Cane Yields from Field 16W., Sophia (Plant Canes and First Ratoons).

FIRST RATOON VARIETY TRIALS REAPED IN BERBICE.

Details of the first ratoon variety trials reaped in Berbice during the period under review are given in Table XVI.

TABLE XVI.

First Ratoon Variety Trials Reaped in Berbice.

Estate.	Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
			Previous Reaping.	Reaping.	Varieties.	Replicates.	
Blairmont.	4 H.P.	11.75	17.XI.33	8.XI.34	9	7	Randomised Blocks.
Port Mourant.	28 A. Emp.	12.00	4.IV.34	3.IV.35	6	6	Latin Square
,,	15 A.O.L.	12.00	20.IV.34	18.IV.35	7	6	Randomised Blocks.

The monthly rainfall reported during the progress of the trials and the mean monthly rainfall at the experimental sites during previous years appear in Appendix I where the variation from the normal is indicated for each experiment.

The results of the examination of samples of soil and subsoil from the experimental sites appear in Appendix II. These data have already been discussed (*Sugar Bulletin* No. 3, pp. 16, 18, 20) when reporting the plant cane results.

TABLE XVII.—**Results of a Variety Trial in Field 15 A.O.L., Port Mourant.**

1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 625	45.51	14.35	9.90	85.3	6.53	117.03	D. 625	12.47
	D. 9/28	41.54	14.16	4.91	88.8	5.87	105.20	G. 119	11.99
	D. 4/28	40.36	14.17	7.57	86.5	5.73	102.69	D. 4/28	11.04
	G. 119	36.11	15.31	5.27	89.0	5.54	99.28	D. 9/28	10.84
	D. 23/28	36.42	15.04	5.11	89.5	5.50	98.57	D. 15/28	10.71
	D. 15/28	39.82	13.64	5.91	88.3	5.45	97.67	D. 23/28	10.58
	D. 11/28	35.16	12.76	6.76	86.3	4.47	80.11	D. 11/28	9.72
	Mean:					5.58	100.00		
	Standard Error:					...	...		
	Significant Difference, 20: 1:					...	...		

(*Plant cane results reported in Sugar Bull. No. 3, p. 16.*)

The results of the trial in Field 15, Ankerville, O.L., Pln. Port Mourant, are recorded in Table XVII and graphically presented in Figure XXV.

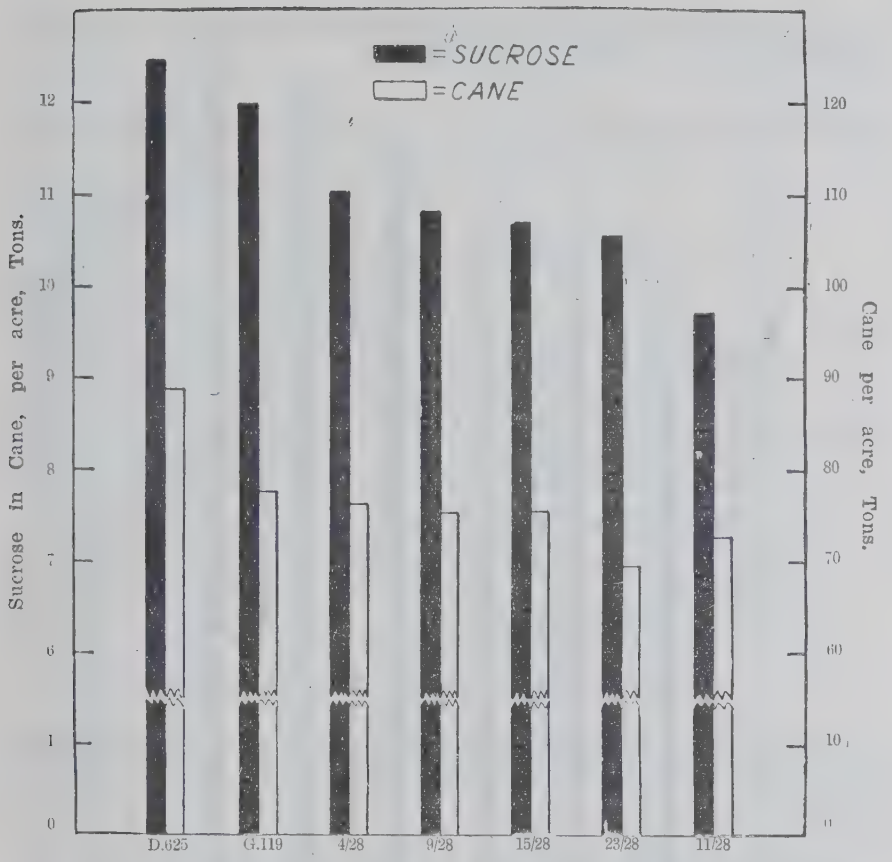

FIG. XXV.

Sucrose and Cane Yields from Field 15A.O.L., Port Mourant (Plant Canes and First Ratoons).

It will be seen that the standard cane, D. 625, came first in the first ratoons and in the combination of two crops. G. 119, which holds second place in the combination, was first in the plant canes but dropped back considerably in cane yield in the first ratoons. It has shown excellent juice characteristics in both crops. D. 11/28, last in this experiment, has given a good account of itself in four experiments in Demerara.

The rainfall on this experiment was below the average for eight out of twelve months of growth, the total deficit amounting to 14.68 in.

The markedly acid clay soil of this field has been discussed on page 16 of *Sugar Bulletin* No. 3.

TABLE XVIII.—**Results of a Variety Trial in Field 28 A.E., Port Mourant.**

1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 2 Crops, Plants and 1st Ratoons,	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 628/21	39.71	13.83	7.50	86.8	5.44	113.81	D. 309/21	11.69
	D. 309/21	38.27	13.50	5.71	86.0	5.17	108.16	D. 628/21	11.38
	D. 625	37.27	13.92	9.58	85.0	5.14	107.53	D. 625	10.79
	D. 6/21	36.25	12.36	13.56	81.8	4.48	93.72	D. 438/21	10.02
	D. 438/21	34.46	12.64	5.72	84.5	4.36	91.21	D. 6/21	9.99
	D. 206/21	28.74	14.27	5.63	88.2	4.09	85.56	D. 206/21	8.86
	Mean:					4.78	100.00		
	Standard Error:					0.25	5.23		
	Significant Difference, 20: 1					0.74	15.48		

(*Plant cane results reported in Sugar Bull. No 3, p. 18.*)

Table XVIII records the data secured from the trial in Field 28 Ankerville East, Pln. Port Mourant. The combined results for two crops are shown in Figure XXVI.

It will be seen that D. 628/21 and D. 309/21 (both seedlings of D. 625), which topped their parent as plant canes, again led the standard cane. In the combined results, D. 309/21 is first and D. 628/21 second, leading D. 625 by 0.90 and 0.59 ton sucrose, respectively.

Rainfall was very deficient during the first three months of growth and again at later periods. Only four months out of twelve had rainfall in excess of the average, and the total deficit for the growth period amounted to 14.35 in.

The markedly acid heavy silt soil of Field 28 A.E., Port Mourant, was described on page 18 of *Sugar Bulletin* No. 3.

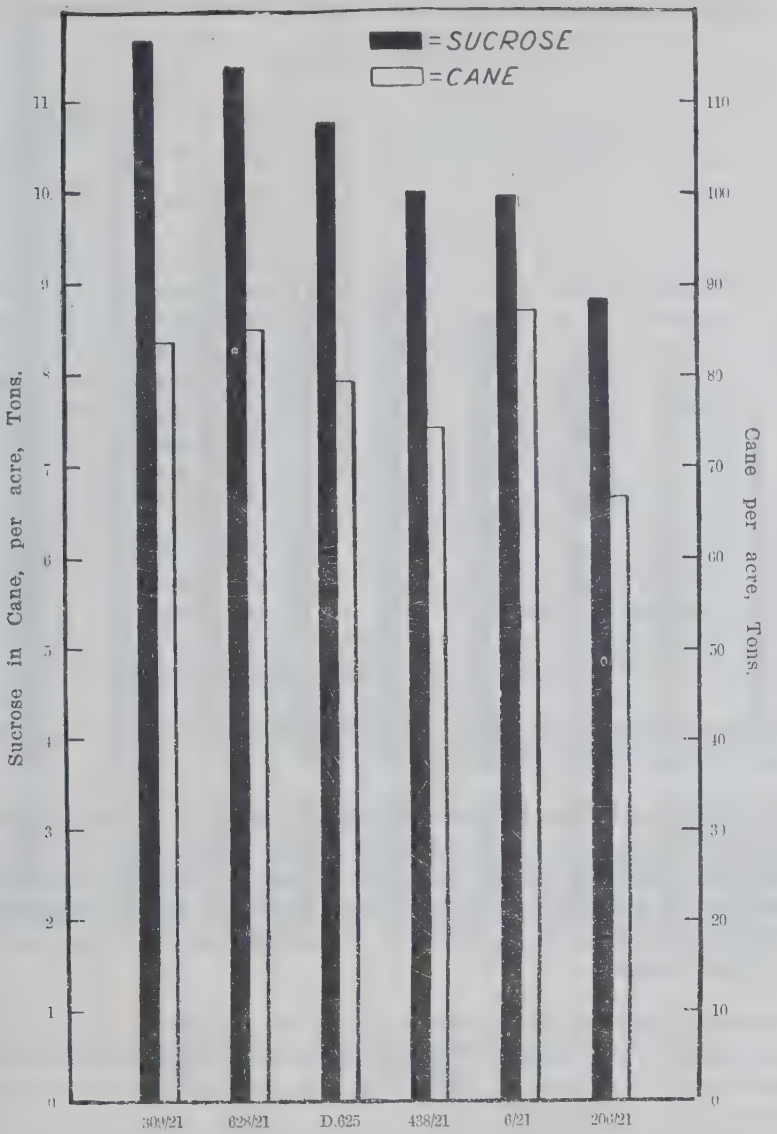

FIG. XXVI.

Sucrose and Cane Yields from Field 28A.E., Port Mourant (Plant Canes and First Ratoons).

TABLE XIX.—**Results of a Variety Trial in Field 4 H., Blairmont.**

1ST RATOONS, 11.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 2 Crops, Plants and 1st Ratoons. Variety.	Sucrose in Cane per Acre. Tons.
MEAN YIELDS:	P.O.J. 2878	38.18	12.85	6.84	84.3	4.90	121.29	P.O.J. 2878	13.90
	<> 10	37.15	12.58	8.06	84.4	4.68	115.84	<> 10	12.95
	D. 857/21	34.09	12.84	9.75	83.3	4.39	108.66	D. 747/13	12.06
	D. 602/22	37.12	11.30	9.85	82.0	4.21	104.21	D. 602/22	11.15
	D. 835/18	36.36	10.70	12.92	79.5	3.89	96.29	D. 857/21	10.98
	D. 747/13	34.18	11.05	15.29	79.7	3.77	93.32	D. 1034/22	10.57
	D. 814/12	34.14	10.92	10.86	81.4	3.73	92.33	D. 835/18	10.31
	D. 1034/22	33.38	10.40	10.50	80.6	3.46	85.64	D. 625	9.79
	D. 625	32.25	10.40	14.90	76.4	3.36	83.17	D. 814/12	9.54
	Mean:					4.04	100.00		
	Standard Error:					0.14	3.47		
	Significant Difference, 20: 1:					0.43	10.64		

(*Plant cane results reported in Sugar Bull. No. 3, p. 20.*)

The experiment in Field 4 Haly Polder, Pln. Blairmont, yielded the results presented in Table XIX and Figure XXVII.

P.O.J. 2878 and Diamond 10 are outstanding in this trial. In the combined results the former leads the standard cane, D. 625, by 4.11 tons sucrose per acre and leads Diamond 10 by .95 ton. D. 747/13 (parent D. 145) is third in the combined results. It had come second in the plant canes but fell off considerably as a first ratoon. Glucose ratios were high, indicating that the canes were not mature when reaped.

Considerable damage was done to this field by excessive rains soon after the plant canes were reaped. Then, from the fourth to the eighth month of growth, rainfall was subnormal. The first ratoon yield was consequently only 56 per cent. of that of the plant canes.

The soil of Field 4 Haly Polder has been described on page 20 of *Sugar Bulletin* No. 3. It is a highly acidic pegassy clay.

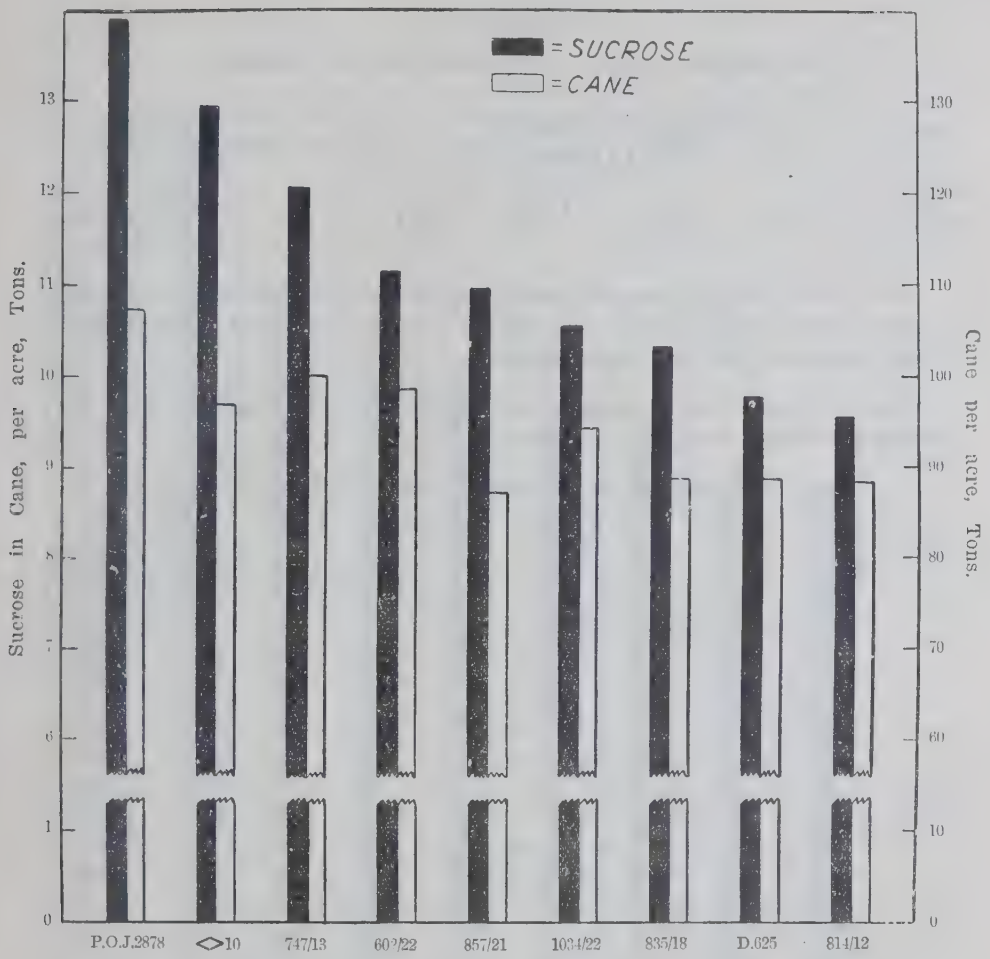

FIG. XXVII.

Sucrose and Cane Yields from Field 4H., Blairmont (Plant Canes and First Ratoons).

FIRST RATOON VARIETY TRIALS REAPED IN EAST DEMERARA.

Details of the first ratoon variety trials reaped in East Demerara during the period under review are given in Table XX.

TABLE XX.

First Ratoon Variety Trials Reaped in East Demerara.

Estate.	Field.	Age of Canes, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates	Type of Layout.
Ogle.	61 O.	12.00	27.IX.33	27.IX.34	8	8	Latin Square.
Diamond.	90 G.D.	12.00	1. X.33	4. X.34	3	7	Randomised Blocks.

The monthly rainfall reported during the growth of the canes and the mean monthly rainfall at the different experimental sites are compared in Appendix I, and the variations from the normal indicated.

Results of the laboratory examination of soil and subsoil samples from the experimental areas are recorded in Appendix II.

TABLE XXI.—**Results of a Variety Trial in Field 61 O., Ogle.**

1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 2 Crops, Plants and First Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
	P.O.J. 2878	28.92	13.13	6.63	86.0	3.80	147.86	P.O.J. 2878	9.51
	D. 602/22	22.02	12.96	7.04	85.3	2.86	111.28	D. 1/28	7.46
	G. 119	19.15	13.85	6.58	87.2	2.85	103.11	D. 625	6.86
MEAN YIELDS:	D. 1/28	20.85	11.72	8.37	84.1	2.44	94.94	D. 13/28	6.80
	D. 4/28	18.33	12.79	8.83	84.7	2.34	91.05	D. 4/28	6.06
	D. 625	19.33	11.98	14.81	80.2	2.32	90.27	D. 3/28	5.86
	D. 13/28	18.60	11.74	8.59	82.9	2.18	84.82	G. 119	5.60
	D. 3/28	18.55	10.79	9.86	81.2	2.01	78.21	D. 602/22	5.40
	Mean:					2.57	100.00		
	Standard Error:					0.16	6.23		
	Significant Difference, 20: 1:					0.49	19.07		

(Plant cane results reported in Sugar Bull. No. 3, p. 24.)

The results of the trial in Field 61 O., Pln. Ogle, are recorded in Table XXI and graphically presented in Figure XXVIII.

The outstanding cane in this trial was P. O. J. 2878 which far outstrips any other variety tried. D. 625 had, as frequently, a high glucose ratio. G. 119,

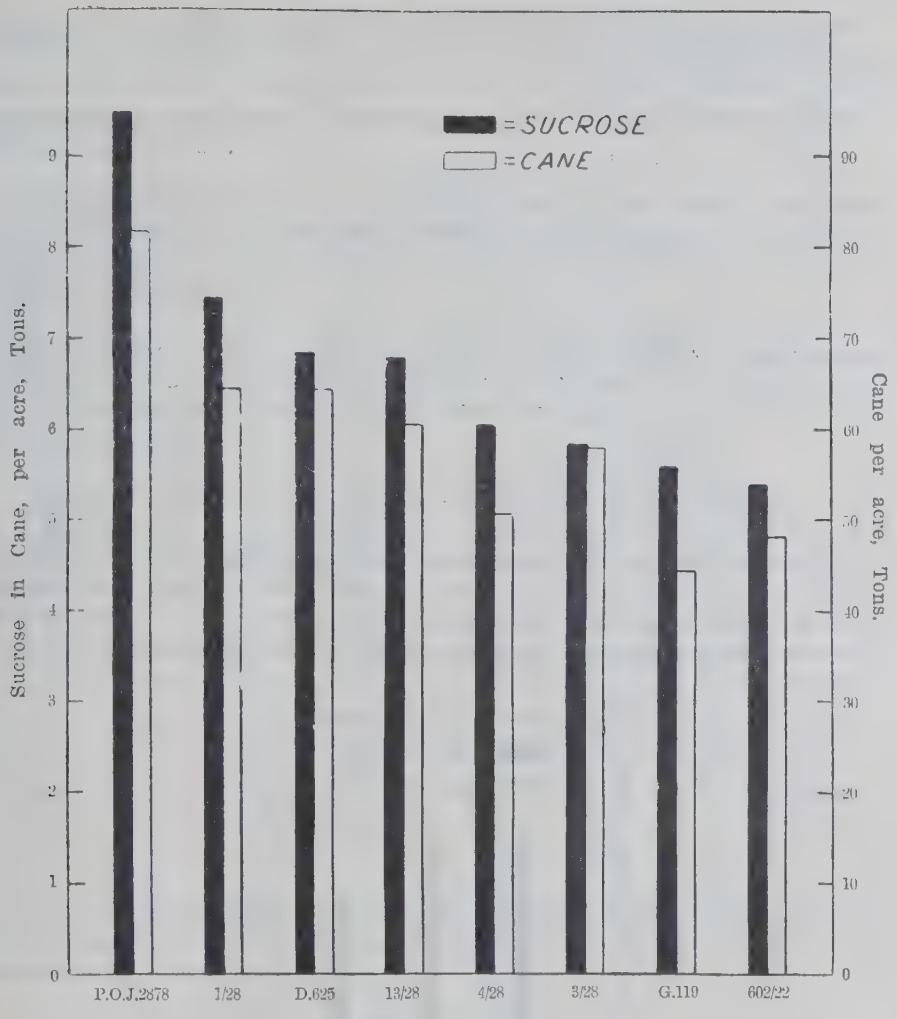

FIG. XXVIII.

Sucrose and Cane Yields from Field 610,, Ogle (Plant Canes and First Ratoons).

which did poorly as a plant, mainly as a result of poor germination, showed improvement as a first ratoon. It has good juice characteristics.

The rainfall on this experiment exceeded the normal for the first four months of growth by a total of 49.68 in. Thereafter, for seven out of eight months, the precipitation was subnormal.

The highly acidic fine silt soil of Field 61 O., Pln. Ogle, has been discussed on page 24 of *Sugar Bulletin* No. 3.

TABLE XXII.—**Results of a Variety Trial in Field 90 G.D., Diamond.**

1st Ratoons, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,	
						Tons.	% Mean.
MEAN YIELDS:	P.O.J.2753	30.91	11.95	9.39	83.8	3.70	105.71
	D. 857/21	29.20	12.27	15.19	79.0	3.64	104.00
	<> 10	22.89	13.74	7.14	86.9	3.15	90.00
	Mean:					3.50	100.00
	Standard Error:					—	—
	Significant Difference, 20 : 1:					—	—

Owing to unavoidable circumstances, the trial in Field 90 G. D., Pln. Diamond, could not be reaped as plant canes. Most of the varieties made very poor growth as first ratoons and only three were deemed worthy of consideration. The data yielded by these are detailed in Table XXII and shown graphically in Figure XXIX.

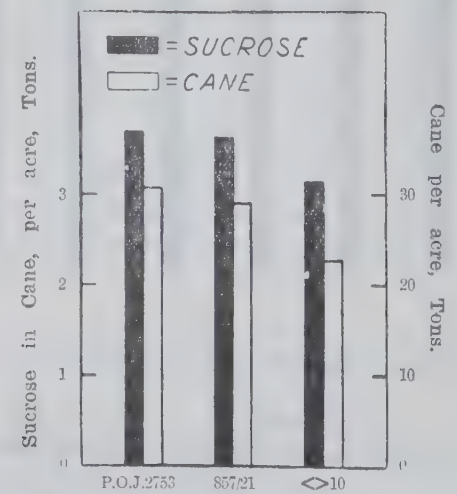

FIG. XXIX.

Sucrose and Cane Yields from Field 90 G.D., Diamond (First Ratoons).

P. O. J. 2753 which outyielded Diamond 10 by 15.71 per cent., is a thin cane which appears to germinate easily and ratoon well. A heavy stooler, it will be tested further as soon as planting material is available. D. 857/21 appears to have been immature when reaped. Its cane yield under very adverse conditions is encouraging.

The poor growth of this field was doubtless partly due to weather conditions. There was a marked excess of 44.27 in. rainfall above the average in the first four months of growth. Then in the succeeding five months there was a total deficit from the normal of 28.22 in.

Both the soil and subsoil of Field 90 G. D. are highly acidic pegassy clays with high organic matter content and wide carbon : nitrogen ratio. The theoretical lime requirement is high and above the average for this type of soil. The soils are of normal salinity.

First Ratoon Variety Trials Reaped in West Demerara.

Details of the first ratoon variety trials reaped in West Demerara during the period are to be found in Table XXIII.

TABLE XXIII.

First Ratoon Variety Trials Reaped in West Demerara.

Estate.	Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
			Previous Reaping.	Reaping.	Varieties.	Replicates	
Uitvlugt.	13 E.	13.00	20.X.33	16.XI.34	11	7	Randomised Blocks.
Wales.	4 B.	12.75	19.III.34	9.IV.35	8	6	"

The monthly rainfall during the growth periods and the average monthly precipitations at the various sites are compared in Appendix I, where the variations from the normal are presented.

Results of the laboratory examination of soil and subsoil samples from the experimental areas are presented in Appendix II.

TABLE XXIV.—**Results of a Variety Trial in Field 4 B., Wales.**

1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 2 Crops, Plants and 1st Ratoons. Variety.	Combined Results for 2 Crops, Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	P.O.J. 2878	37.79	14.35	6.99	88.9	5.43	125.40	P.O.J. 2878	9.10
	Diamond 10	35.07	13.51	6.24	89.4	4.75	109.70	Diamond 10	8.99
	Co. 213	37.40	12.23	9.99	85.2	4.58	105.77	Co. 213	8.01
	Co. 281	34.06	13.29	4.46	89.2	4.53	104.62	P.O.J. 253	7.49
	P.O.J. 253	33.17	13.04	5.63	87.9	4.33	100.00	D. 625	7.41
	D. 814/12	28.79	13.04	8.33	87.5	3.77	87.07	Co. 281	7.34
	D. 625	32.02	11.68	20.51	80.0	3.73	86.14	Co. 210	7.01
	Co. 210	29.18	12.09	8.14	85.9	3.51	81.06	D. 814/12	6.22
	Mean:					4.33	100.00		
	Standard Error:					0.18	4.16		
	Significant Difference, 20: 1					0.52	12.01		

(Plant cane results reported in Sugar Bull. No. 3, p. 26.)

The results of the first ratoon trial in Field 4 Bellevue, Pln, Wales, appear in Table XXIV and Figure XXX.

It will be seen that P. O. J. 2878 has outyielded Diamond 10 as a first ratoon by nearly 16 per cent. In the combined results for two crops, P. O. J. 2878 came first, Diamond 10 second and Co. 213 third. The standard cane, D. 625, came fifth. Co. 213 is a thin Indian cane which has outyielded D. 625 in this trial and in a trial on frontland soil (Field 2 West, Sophia). It usually has better juice qualities than D. 625.

Except for the months of July and October 1934, and February 1935, the rainfall on this experiment was consistently subnormal. The total deficit was 23.99 in.

The pegassy clay soil of Field 4 B., Wales, was described on page 26 of *Sugar Bulletin* No. 3.

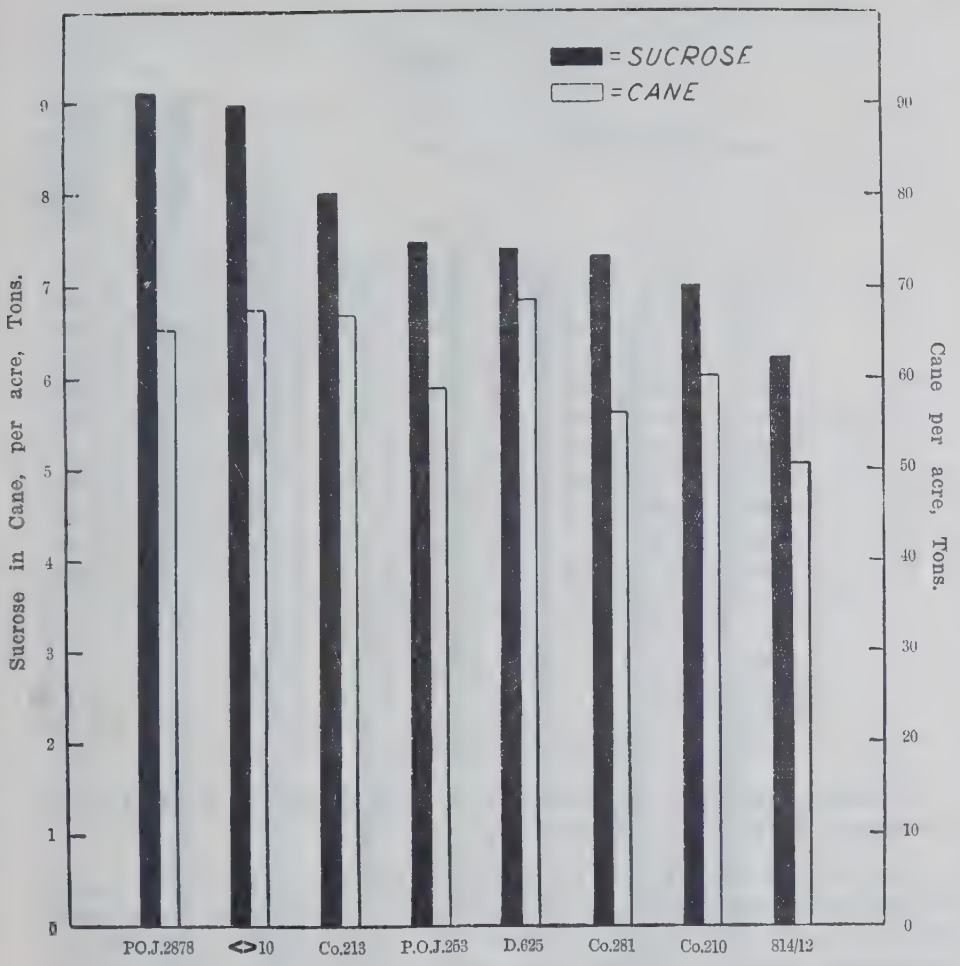

FIG. XXX.

Sucrose and Cane Yields from Field 4B., Wales (Plant Canes and First Ratoons).

TABLE XXV.—**Results of a Variety Trial in Field 13 E., Uitvlugt.**

1ST RATOONS, 13.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 2 Crops, Plants, and 1st Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
	D. 11/28	29.72	12.95	5.93	88.8	3.84	118.15	**D. 11/28**	10.24
	D. 23/28	27.12	13.86	4.54	90.4	3.76	115.69	D. 9/28	9.29
	D. 15/28	27.71	13.39	4.55	90.5	3.70	113.85	D. 625	8.65
	D. 3/28	31.39	11.44	8.08	84.4	3.60	110.77	D. 4/28	8.53
MEAN	D. 625	28.57	12.12	10.80	83.5	3.47	106.77	D. 3/28	8.40
YIELDS:	D. 9/28	24.91	13.48	4.01	89.8	3.35	103.08	D. 23/28	7.80
	D. 602/22	25.49	12.92	6.15	86.9	3.29	101.23	D. 24/28	6.84
	D. 4/28	24.51	13.13	7.86	86.8	3.21	98.77	D. 10/28	6.71
	D. 24/28	22.83	12.95	4.59	89.4	2.97	91.38	D. 602/22	6.49
	D. 10/28	18.26	12.83	5.50	86.8	2.34	72.00	D. 13/28	6.14
	D. 13/28	19.21	11.84	9.06	83.8	2.27	69.85	D. 15/28	6.04
	Mean:					3.25	100.00		
	Standard Error:					0.20	6.15		
	Significant Difference, 20: 1:					0.62	19.08		

(*Plant cane results reported in Sugar Bull. No. 3, p. 27.*)

Detailed results of the first ratoon trial in Field 13 East, Pln. Uitvlugt, are to be found in Table XXV and Figure XXXI.

D. 11/28, which definitely outyielded the standard cane as a plant, again leads D. 625 by a wide margin in the first ratoons. Taking the two crops together it has a total lead of 1.59 tons sucrose per acre over D. 625 and appears well suited to this area. This seedling of the cross S. C. 12/4 x D. 625 has done well at Non Pareil, La Bonne Intention, Sophia and Uitvlugt but appears unsuited to the Ankerville Old Land section at Port Mourant, It usually has better juice qualities than D. 625. In this trial purities were high and glucose ratios, except for D. 625, low.

In its first three months of growth this trial suffered from the excess rainfall of the flood period. Thereafter, with two exceptions, the monthly precipitation was always below the average.

The soil of Field 13 E., Uitvlugt, discussed on page 29 of *Sugar Bulletin* No. 3, is a highly acidic clay.

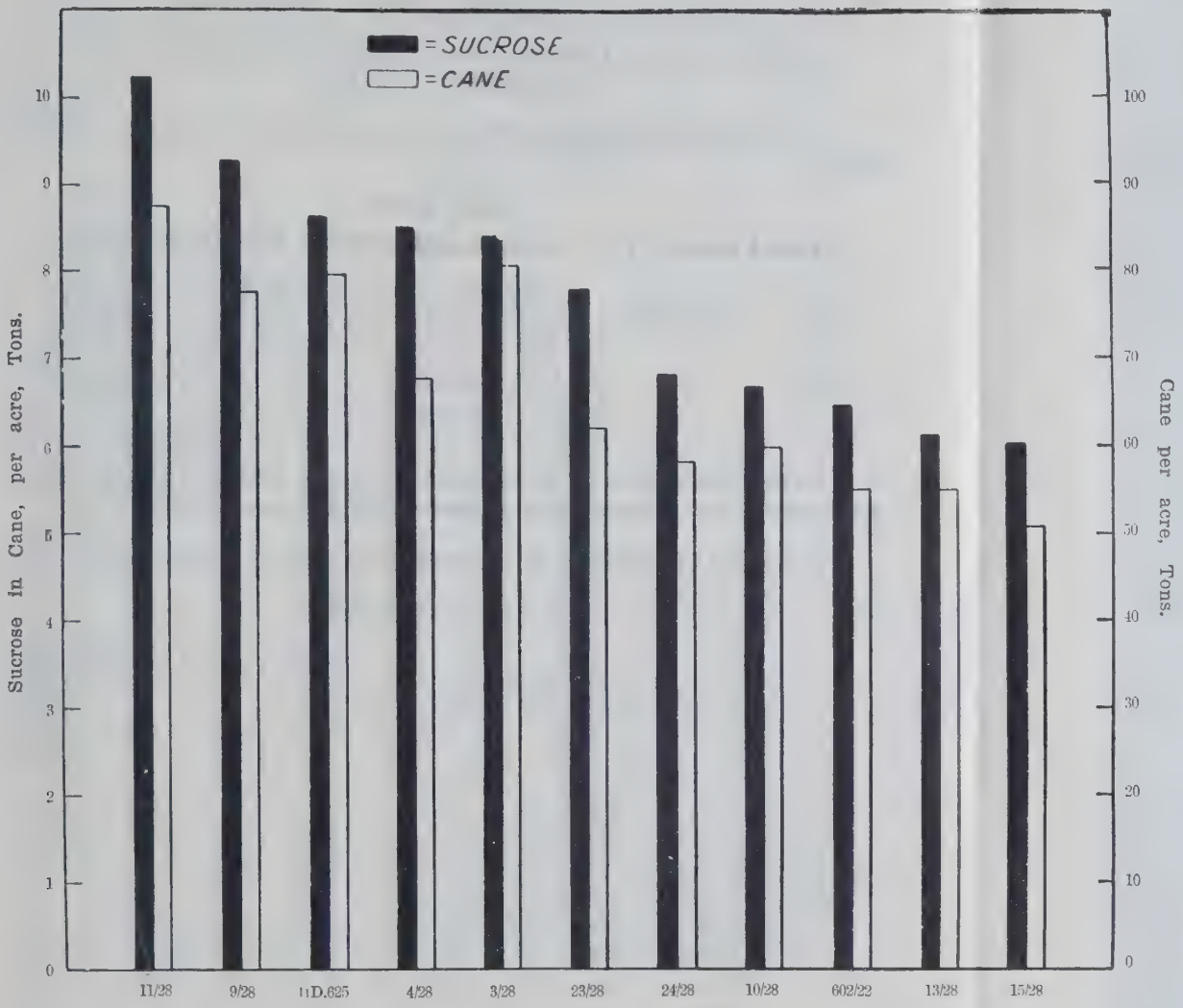

FIG. XXXI.

Sucrose and Cane Yields from Field 13 E., Uitvlugt (Plant Canes and First Ratoons).

SUB-SECTION C.— SECOND RATOON VARIETY TRIALS.

SECOND RATOON VARIETY TRIALS REAPED AT SOPHIA SUGAR EXPERIMENT STATION.

A list of the second ratoon variety trials reaped at Sophia is given in Table XXVI.

TABLE XXVI.

Second Ratoon Variety Trials Reaped at Sophia Experiment Station.

Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
		Previous Reaping.	Reaping.	Varieties.	Replicates.	
5 East	12.50	12.IX.33	25.IX.34	8	7	Randomised Blocks.
6 „	12.25	14.IX.33	21.IX.34	5	7	„

Detailed information as to the rainfall and soil conditions at the various experimental sites is presented in Appendices I and II, respectively.

TABLE XXVII.—**Results of a Variety Trial in Field 5 East, Sophia.**

2ND RATOONS, 12.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre Tons.
MEAN YIELDS:	◇ 10	21.64	13.66	4.64	87.0	2.97	154.69	◇ 10	11.95
	S.C. 12/4	18.29	12.50	4.94	85.4	2.29	119.27	D. 625	10.89
	P.O.J. 2714	18.37	11.19	6.49	82.1	2.06	107.29	D. 53/27	10.53
	D. 6/21	18.11	10.48	15.59	76.8	1.91	99.48	P.O.J. 2714	9.74
	D. 625	14.50	12.60	8.02	84.3	1.82	94.79	S.C. 12/4	9.39
	D. 602/22	14.15	12.37	6.22	84.2	1.75	91.15	D. 6/21	9.24
	D. 403/18	13.74	11.35	7.34	81.2	1.57	81.77	D. 602/22	9.04
	D. 53/27	7.80	12.75	6.39	84.8	1.01	52.60	D. 403/18	8.96
	Mean:					1.92	100.00		
	Standard Error:					0.15	7.81		
	Significant Difference, 20: 1:					0.46	23.96		

(*Plant cane results reported in Sugar Bull. No. 1, p. 5.*)

(*First ratoon results reported in Sugar Bull. No. 3, p. 32.*)

The results of the second ratoon trial in Field 5 East, Sophia, are recorded in Table XXVII and shown graphically in Figure XXXII.

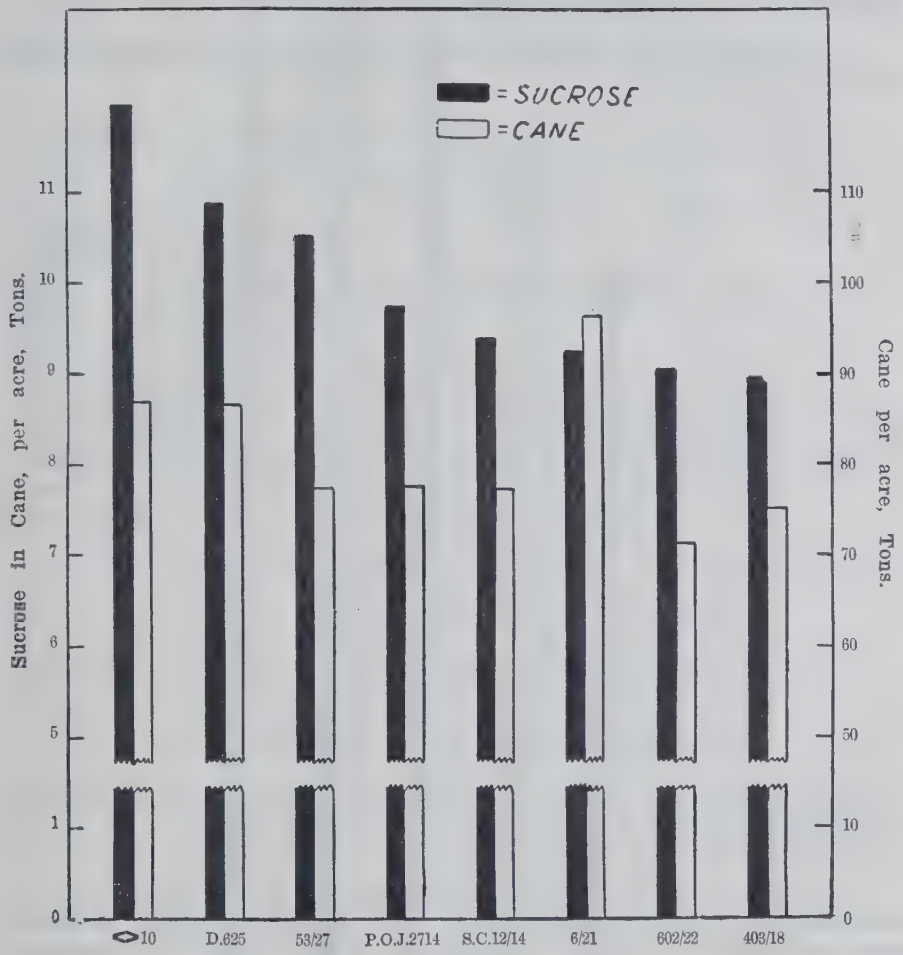

FIG. XXXII.

Sucrose and Cane Yields from Field 5 E., Sophia (Plant Canes, First and Second Ratoons).

Diamond 10 has definitely outyielded all the other canes as a second ratoon in this particular trial and has led its nearest rival, D. 625, by 1.06 ton sucrose per acre when the total yields for three crops are considered.

Rainfall conditions were very adverse to this experiment. From November 1933 to January 1934 there was a total excess of 38.35 in. During the other months of the growth period there was a total deficit from the normal of 25.86 in.

The markedly acidic clay soil of Field 5 E., Sophia, was discussed on page 32 of *Sugar Bulletin* No. 3.

TABLE XXVIII.—**Results of a Variety Trial in Field 6 East, Sophia.**

2ND RATOONS, 12.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
	P.O.J. 1499	24.10	12.53	7.15	83.9	3.30	142.86	P.O.J. 1499	11.49
MEAN	P.O.J. 213	21.30	10.98	6.99	82.8	2.34	101.30	S.W. 3	11.41
YIELDS:	B.H. 10 (12)	16.11	13.26	6.04	87.2	2.14	92.64	D. 625	11.34
	D. 625	14.41	13.19	9.57	84.1	1.90	82.25	P.O.J. 213	9.65
	S.W. 3	13.98	13.46	6.29	86.8	1.89	81.82	B.H. 10 (12)	8.37
	Mean:					2.31	100.00		
	Standard Error:					0.14	6.06		
	Significant Difference, 20: 1:					0.43	18.61		

(*Plant cane results reported in Sugar Bull. No. 1. p. 5.*)

(*First ratoon results reported in Sugar Bull. No. 3. p. 34.*)

Table XXVIII and Figure XXXIII give the results obtained from the trial in Field 6 East, Sophia.

P.O.J. 1499 definitely outyielded its competitors as a second ratoon and headed the list for three crops combined. S.W. 3, another variety of Javan origin, was disappointing as a second ratooner but came second in the combined results.

This field also, was adversely affected by an excess of 38.35 in. of rain at one period and a deficit from the mean of 24.35 in. during the other months of the growing season.

A discussion of the soil data from Field 6 E., Sophia, will be found on page 34 of *Sugar Bulletin* No. 3. It is a markedly acidic clay.

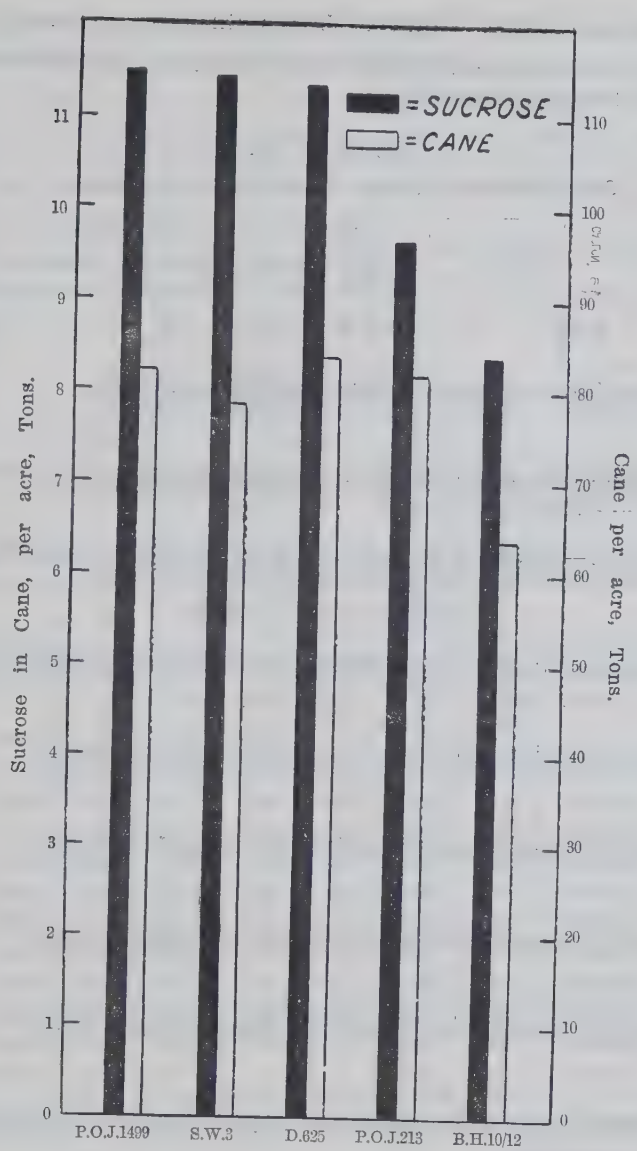

FIG. XXXIII.

Sucrose and Cane Yields from Field 6 E., Sophia (Plant Canes, First and Second Ratoons).

Second Ratoon Variety Trials Reaped in Berbice.

Details of the three second ratoon variety trials reaped in Berbice during the period will be found in Table XXIX.

Table XXIX.

Second Ratoon Variety Trials Reaped in Berbice.

Estate.	Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
			Previous Reaping.	Reaping.	Varieties.	Replicates.	
Blairmont	18 R.	12.00	12.X.33	10.X.34	12	7	Randomised Blocks.
Port Mourant.	8 A.	12.25	6.X.33	11.X.34	10	7	,,
,,	14 A.O.L.	12.25	12.IV.34	17.IV.35	4	7	,,

The rainfall and soil data from the experimental sites are presented, respectively, in Appendices I and II.

Table XXX.—Results of a Variety Trial in Field 8 A., Port Mourant.

2nd Ratoons, 12.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre Tons.
Mean Yields:	S.C. 12/4	21.24	12.92	4.00	89.0	2.74	111.38	D. 625	13.65
	D. 695/13	22.19	11.91	7.27	84.5	2.65	107.72	D. 666/18	13.41
	D. 602/22	20.66	12.73	5.57	85.0	2.64	107.32	D. 602/22	11.79
	B.H. 10/12	18.41	13.94	3.44	89.5	2.53	102.85	D. 424/21	11.70
	D. 679/20	17.91	13.83	5.90	88.9	2.50	101.63	D. 679/20	11.61
	D. 625	19.13	12.99	9.76	84.4	2.49	101.22	D. 695/13	11.56
	D. 424/21	17.66	14.11	4.62	88.5	2.49	101.22	S.C. 12/4	11.53
	D. 557/20	20.99	11.49	5.76	85.2	2.39	97.15	D. 557/20	11.27
	D. 666/18	19.94	11.45	7.77	82.3	2.29	93.09	D. 835/18	11.24
	D. 835/18	15.85	12.15	8.11	84.3	1.92	78.05	B.H. 10/12	11.03
	Mean:					2.46	100.00		
	Standard Error:					...	...		
	Significant Difference, 20: 1:					...	...		

(*Plant cane results reported in Sugar Bull. No. 1, p. 32.*)

(*First ratoon results reported in Sugar Bull. No. 3, p. 38.*)

Table XXX and Figure XXXIV present the results obtained from the experiment in Field 8 Ankerville, Pln. Port Mourant.

S.C. 12/4 recovered somewhat in the second ratoon crop, a feature it has shown on several occasions, but not enough to enable it to displace the standard cane when the output for three crops is considered. The only cane which came near D. 625 was D. 666/18, a heavy yielder of somewhat low quality cane.

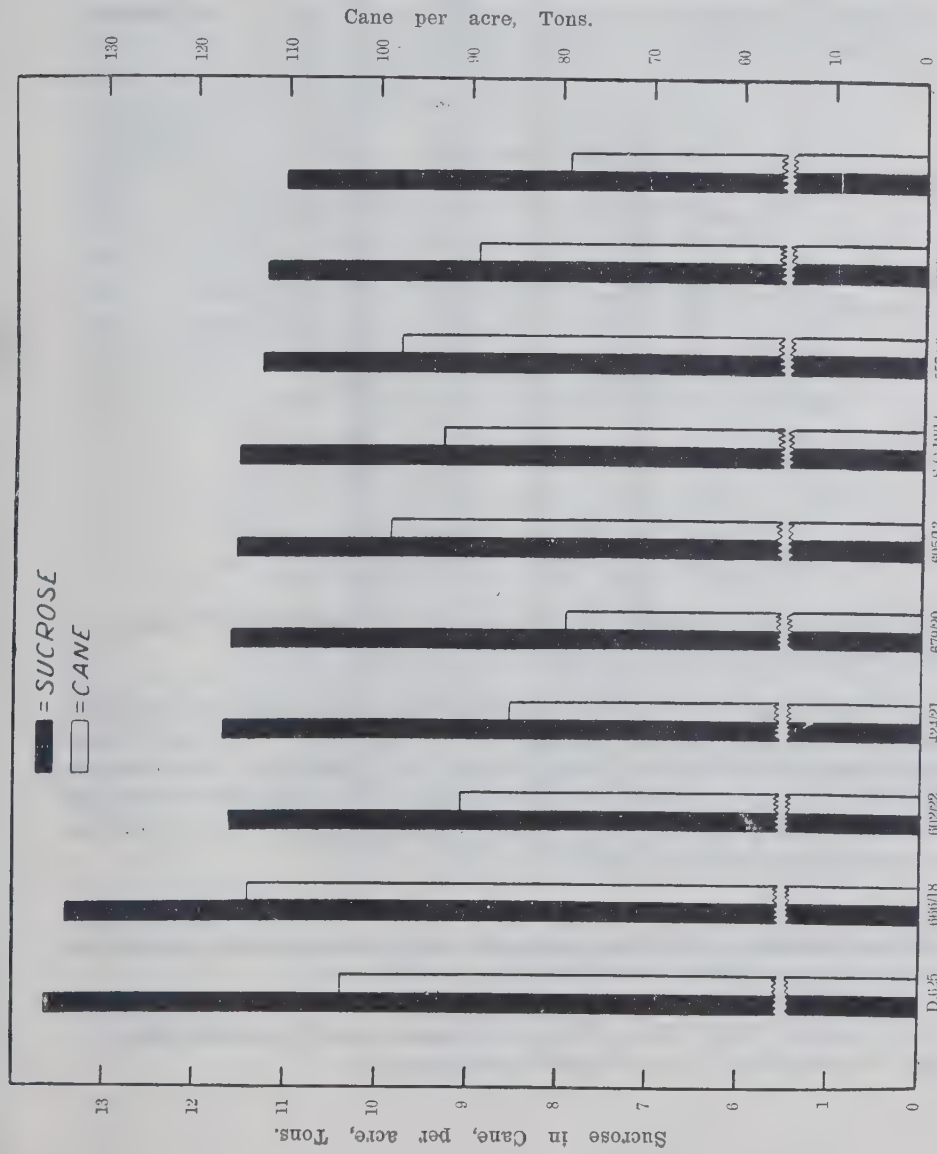

FIG. XXXIV.

Sucrose and Cane Yields from Field 8 A., Port Mourant (Plant Canes, First and Second Ratoons).

Rainfall was excessive in November and December 1933, and July 1934. For the rest of its growth period this experiment received less rain than might have been expected.

A description of the slightly acid heavy silt soil of Field 8 A., Port Mourant will be found on page 31 of *Sugar Bulletin* No. 1.

TABLE XXXI.—**Results of a Variety Trial in Field 14 A.O.L., Port Mourant.**

2ND RATOONS, 12.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	D. 241/21	38.46	15.31	4.45	89.5	5.89	107.48	D. 241/21	20.01
	D. 695/13	38.10	14.61	5.60	88.1	5.57	101.64	D. 625	18.73
	D. 625	37.73	14.69	8.92	85.9	5.55	101.28	D. 695/13	18.09
	D. 835/18	34.57	14.34	7.22	87.9	4.92	89.78	D. 835/18	17.08
	Mean:					5.48	100.00		
	Standard Error:					...	...		
	Significant Difference. 20 : 1:					...	...		

(*Plant cane results reported in Sugar Bull. No. 2, p. 15.*)

(*First ratoon results reported in Sugar Bull. No. 3, p. 40.*)

The results of the second ratoon trial in Field 14 Ankerville Old Land, Pln. Port Mourant, will be found in Table XXXI and Figure XXXV.

D. 241/21 came first in this experiment with a very heavy yield as a plant cane. As a first ratoon it came second, being led by D. 625. As a second ratoon it has shown superiority to the standard cane in tonnage and juice qualities. Considering the total yield for three crops, D. 241/21 has outyielded the standard cane by 1.28 tons sucrose per acre. Further tests are being carried out with this cane which is a seedling of D. 625.

The total rainfall on this trial was 14.35 in. below the average that might have been expected. Of the first six months of the growing period, only one had rainfall above the average.

The soil of Field 14 A. O. L., Port Mourant, was discussed on page 15 of *Sugar Bulletin* No. 2. It is a markedly acid heavy silt.

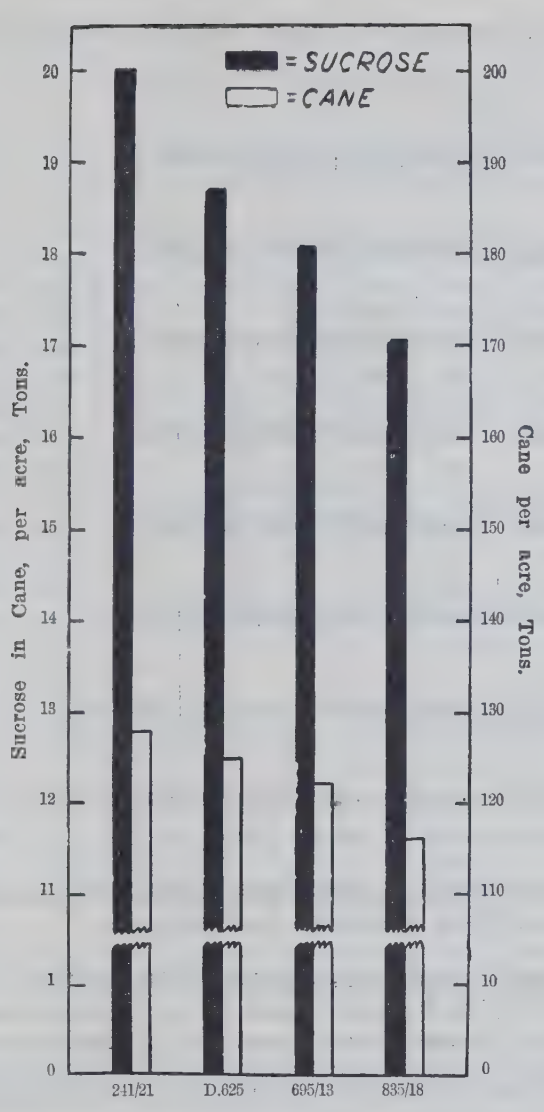

FIG. XXXV.

Sucrose and Cane Yields from Field 14 A.O.L., Port Mourant (Plant Canes, First and Second Ratoons).

TABLE XXXII.—**Results of a Variety Trial in Field 18 R., Blairmont.**

2ND RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	◇ 10	27.69	13.27	5.87	88.3	3.69	122.19	◇ 10	14.92
	D. 424/21	27.06	12.96	5.34	88.5	3.50	115.89	D. 424/21	13.70
	D. 663/13	27.78	12.08	6.17	86.4	3.35	110.93	D. 666/18	12.62
	D. 666/18	26.94	11.49	9.23	83.9	3.07	101.66	D. 835/18	12.42
	D. 602/22	23.84	12.38	6.42	85.9	2.95	97.68	D. 625	12.30
	D. 695/13	24.67	11.96	6.34	86.6	2.93	97.02	D. 351/20	12.25
	D. 625	25.33	11.56	9.07	83.7	2.90	96.03	D. 695/13	11.82
	D. 684/21	26.44	11.00	12.66	81.0	2.89	95.70	D. 684/21	11.61
	D. 814/12	23.69	12.05	6.57	86.3	2.84	94.04	D. 814/12	11.44
	D. 351/20	22.28	12.39	7.68	86.3	2.72	90.07	D. 663/13	11.36
	D. 557/20	22.14	12.32	5.57	86.6	2.72	90.07	D. 602/22	11.31
	D. 835/18	22.17	12.02	8.58	86.0	2.65	87.75	D. 557/20	11.26
	Mean:					3.02	100.00		
	Standard Error:					0.16	5.30		
	Significant Difference, 20: 1:					0.48	15.89		

(*Plant cane results reported in Sugar Bull. No. 1, p. 18.*)

(*First ratoon results reported in Sugar Bull. No. 3, p. 42.*)

In Table XXXII and Figure XXXVI will be found the results of the second ratoon trial reaped in Field 18 Riverside, Pln. Blairmont.

Diamond 10 has again shown its superiority. D. 424/21 has led the standard cane, D. 625, in total yield for three crops by 1.4 tons sucrose, a wide margin, but is itself surpassed by Diamond 10 with a margin of 1.22 tons sucrose.

Deluged by 31.02 in. of extra rainfall in the first four months, the canes in this experiment had, for six out of eight remaining months of growth, considerably less rain than the average.

A discussion of the highly acidic fine silt soil of Field 18 R., Blairmont, will be found on page 17 of *Sugar Bulletin* No. 1.

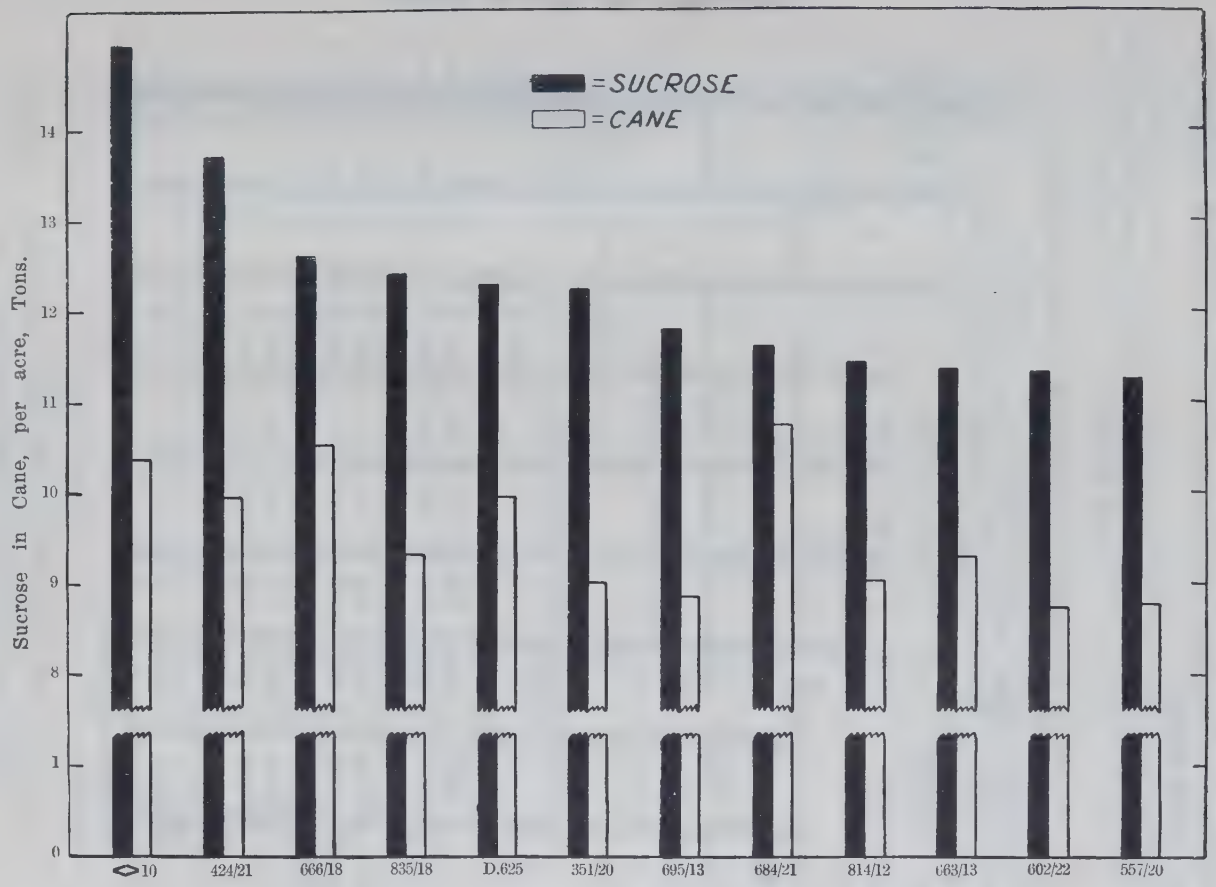

FIG. XXXVI.

Sucrose and Cane Yields from Field 18 R., Blairmont (Plant Canes, First and Second Ratoons).

Second Ratoon Variety Trials Reaped in East Demerara.

Details of the two second ratoon experiments reaped in East Demerara are given in Table XXXIII.

Table XXXIII.

Second Ratoon Variety Trials Reaped in East Demerara.

Estate.	Field.	Age of Canes, Months.	Date of		Number of		Type of Layout.
			Previous Reaping.	Reaping.	Varieties.	Replicates.	
Diamond.	89 G.D.	11.50	14.XI.33	1.XI.34	4	7	Randomised Blocks.
Lusignan.	38 A.	11.75	6.II.34	31.I.35	9	7	,,

The usual rainfall and soil data are presented in Appendices I and II, respectively.

Table XXXIV.—Results of a Variety Trial in Field 38 A., Lusignan.

2nd Ratoons, 11.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
	D. 628/21	21.26	13.55	9.67	86.2	2.87	125.88	D. 628/21	9.65
	D. 663/13	19.82	13.95	5.39	89.9	2.75	120.61	D. 663/13	9.16
	D. 625	19.80	13.34	12.42	85.3	2.64	115.79	D. 625	8.93
Mean	D. 695/13	19.57	13.25	5.95	88.0	2.58	113.16	D. 602/22	8.39
Yields:	D. 648/22	19.44	12.65	8.69	86.2	2.46	107.89	D. 648/22	8.27
	D. 602/22	16.29	13.40	6.29	87.1	2.18	95.61	D. 92/21	8.22
	D. 92/21	15.86	13.66	8.61	86.9	2.17	95.18	D. 695/13	8.17
	D. 835/18	11.82	12.27	9.20	85.4	1.45	63.60	D. 835/18	7.54
	D. 573/22	10.57	13.66	5.94	88.0	1.44	63.16	D. 573/22	7.38
	Mean:					2.28	100.00		
	Standard Error:					0.14	6.14		
	Significant Difference, 20: 1:					0.44	19.30		

(Plant cane results reported in Sugar Bulletin No. 2, p. 12.)

(First ratoon results reported in Sugar Bulletin No. 3, p. 48.)

The results of the test in Field 38 Annandale, Pln. Lusignan, are given in Table XXXIV and Figure XXXVII.

D. 628/21, which gave a good account of itself in Field 28 A.E., Port Mourant, has topped the other varieties tried in this field and led D. 625 by a total of 0.72 tons sucrose for three crops.

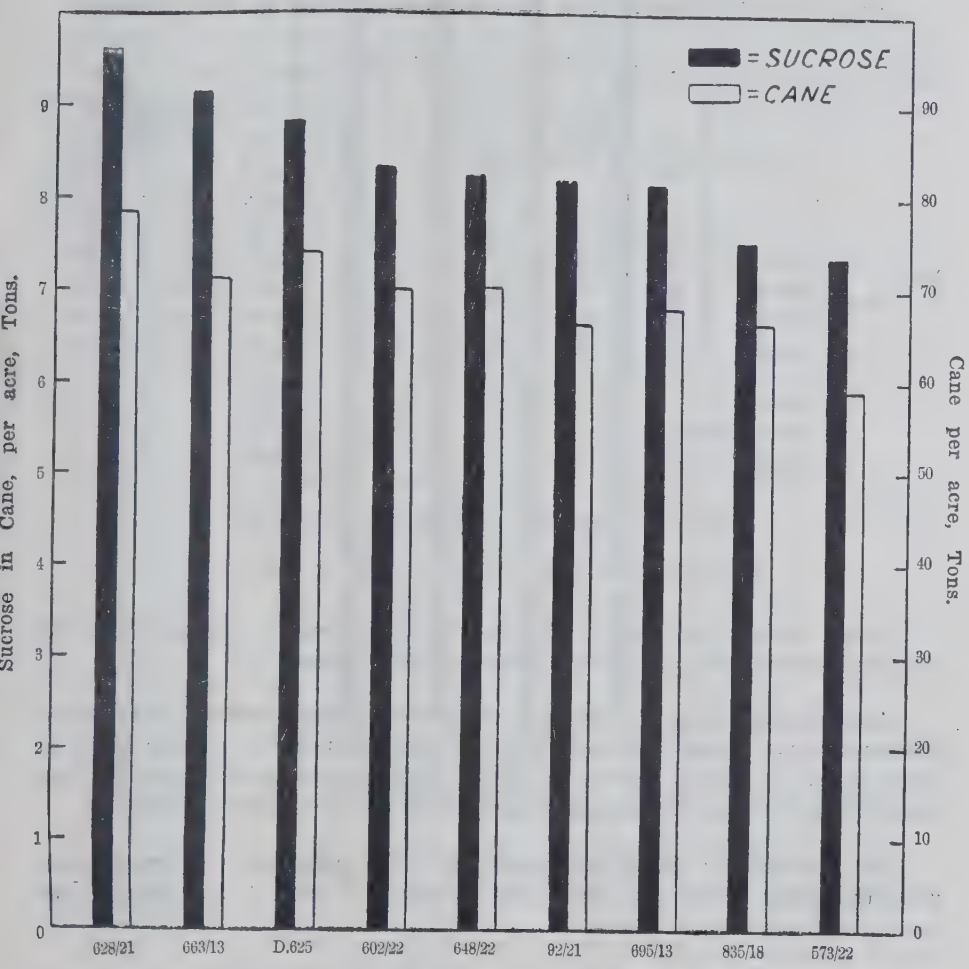

FIG. XXXVII.

Sucrose and Cane Yields from Field 38 A., Lusignan (Plant Canes, First and Second Ratoons).

Field 38 A. was unfortunate as regards rain distribution. This was subnormal for ten out of twelve months of growth. The total deficit was 22.77 in.

The soil of Field 38 A., Lusignan, has been discussed on page 13 of *Sugar Bulletin* No. 2. It is a markedly acidic heavy silt.

TABLE XXXV.—**Results of a Variety Trial in Field 89 G.D., Diamond.**

2ND RATOONS, 11.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre,		Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons.	
						Tons.	% Mean.	Variety.	Sucrose in Cane per Acre, Tons.
MEAN YIELDS:	P.O.J. 2727	20.74	11.39	10.76	80.9	2.37	150.96	P.O.J. 2727	13.40
	◇ 10	12.13	13.51	7.69	85.2	1.63	103.82	D. 927/22	12.55
	D. 927/22	15.74	7.29	31.73	64.8	1.15	73.25	◇ 10	12.29
	D. 602/22	10.59	10.63	12.90	78.9	1.12	71.34	D. 602/22	12.02
	Mean:					1.57	100.00		
	Standard Error:					0.11	7.01		
	Significant Difference, 20: 1:					0.35	22.29		

(*Plant cane results reported in Sugar Bull. No. 1, p. 21.*)

(*First ratoon results reported in Sugar Bull. No. 3, p. 50.*)

Table XXXV and Figure XXXVIII give the results obtained from the second ratoon trial in Field 89 Great Diamond, Pln. Diamond.

Another thin cane, P.O.J. 2727, has done well here, definitely outyielding Diamond 10 as a second ratoon and producing 1.11 tons sucrose per acre more in three crops. D. 927/22 (parent D. 4399) has also outyielded Diamond 10. The glucose ratios indicate that the canes of this field were not mature at reaping.

The canes in this trial had too much rain in the early stages of growth and went through a severe dry spell from February to June 1934. Rainfall was again heavy just prior to reaping.

The highly acid pegassy clay soil of this experimental site has been previously described in *Sugar Bulletin* No. 1, p. 21.

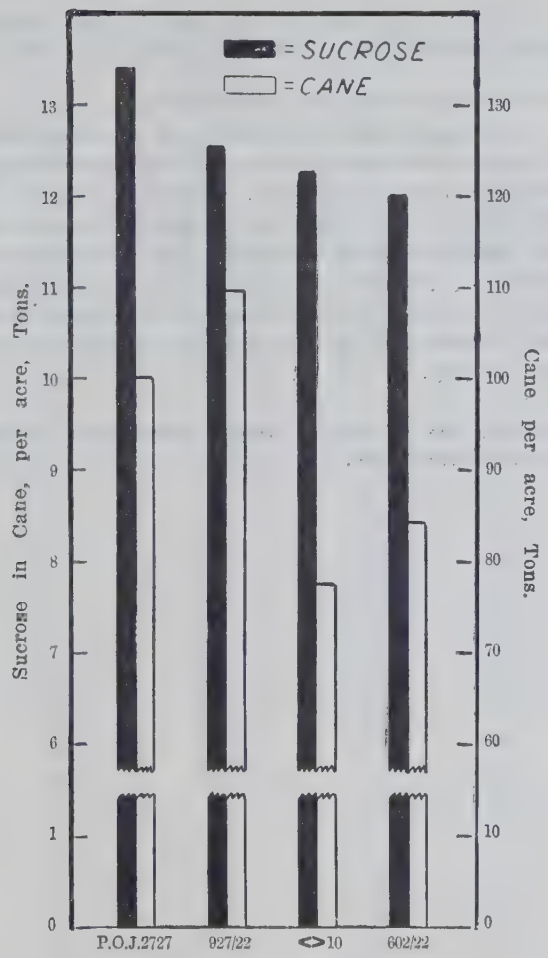

FIG. XXXVIII.

Sucrose and Cane Yields from Field 89 G.D., Diamond (Plant Canes, First and Second Ratoons).

SUB-SECTION D.—DISCUSSION AND SUMMARY OF RESULTS.

Tables XXXVI, XXXVII and XXXVIII summarise, respectively, the relative status of :—

(*a*) The varieties which have been reaped as plant canes, first ratoons and second ratoons ;

(*b*) The varieties which have been reaped as plant canes and first ratoons only ;

(*c*) The varieties which have been reaped as plant canes only.

Included in the last two Tables, for the sake of easy comparison, are the mean figures for the varieties D. 625, Diamond 10 and P.O.J. 2878.

The method of arriving at the data presented is as follows :—the yield of each variety, in each experiment, is calculated as a percentage of the yield of D. 625, the standard cane, in that same experiment. The percentages thus obtained are grouped together and a mean calculated. Thus as plant canes in one trial a variety may yield 105 per cent., in another 110 per cent., and in another 115 per cent. of the D. 625 yields in each of these trials. The mean plant cane yield of the seedling is therefore 110 per cent. of that of D. 625. The general average plant cane yield of D. 625 for all experiments executed to date is 4.77 tons sucrose per acre. This figure is multiplied by 1.10 to obtain the corrected plant cane yield for the hypothetical variety.

Wherever a variety has been tested three or more times, the data concerning it have been printed in heavy type.

TABLE XXXVI.—**Mean Sucrose Yields from Three Crops.**

Variety.	Mean Sucrose, Tons per acre (Corrected Values),				Total yield, D.625=100.0
	Plants.	First Ratoons.	Second Ratoons.	Total.	
Diamond 10	**5.29**	**4.38**	**4.50**	**14.17**	**127.9**
P.O.J. 2878	**5.70**	**4.99**	3.00	13.69	123.6
P.O.J. 2727	4.49	**4.08**	4.64	13.21	119.2
D. 447/17	5.91	3.92	2.94	12.77	115.3
Diamond 17	4.75	3.73	3.56	12.04	108.7
D. 927/22	5.11	3.98	2.94	12.03	108.6
P.O.J. 1499	4.12	3.21	4.60	11.93	107.7
D. 628/21	4.99	4.04	2.88	11.91	107.5
D. 666/18	**4.69**	**3.85**	**2.95**	**11.49**	**103.7**
D. 31/17	5.12	3.50	2.83	11.45	103.3
D. 203/20	**4.41**	3.83	3.06	11.30	102.0
D. 241/21	5.06	3.43	2.81	11.30	102.0
D. 1034/22	4.97	3.52	2.69	11.17	100.8
D. 625	**4.77**	**3.66**	**2.65**	**11.08**	**100.0**
D. 207/20	4.80	3.82	2.43	11.05	99.7
S.W. 3	5.00	3.41	2.64	11.05	99.7
D. 895/22	**4.49**	3.52	3.00	11.01	99.4
D. 424/21	**4.46**	**3.48**	**2.86**	**10.80**	**97.5**
D. 1034/21	4.56	3.47	2.76	10.79	97.4
D. 893/21	3.95	3.62	3.17	10.74	96.9
S.C. 12 (4)	**4.00**	**3.53**	**3.14**	**10.67**	**96.3**
D. 602/22	**4.36**	**3.58**	**2.71**	**10.65**	**96.1**
D. 557/20	**4.32**	**3.29**	**2.93**	**10.54**	**95.1**
D. 351/20	**4.97**	**3.37**	**2.17**	**10.51**	**94.9**
D. 663/13	**4.32**	**3.43**	**2.76**	**10.51**	**94.9**
D. 92/21	4.32	3.97	2.18	10.47	94.5
D. 695/13	**4.18**	**3.63**	**2.65**	**10.46**	**94.4**
D. 648/22	4.15	3.81	2.47	10.43	94.1
D. 573/22	**4.85**	3.50	2.00	10.35	93.4
D. 814/12	**4.15**	**3.49**	2.69	10.33	93.2
D. 628/20	3.73	3.55	3.00	10.28	92.8
D. 684/21	**4.69**	3.14	2.44	10.27	92.7
D. 204/20	**4.85**	**3.03**	2.36	10.24	92.4
D. 835/18	**4.37**	**3.46**	**2.36**	**10.19**	**92.0**
P.O.J. 2725	4.20	3.51	2.45	10.16	91.7
P.O.J. 2714	4.20	2.91	3.00	10.11	91.2
P.O.J. 213	3.77	3.05	3.26	10.08	91.0
D. 6/21	**4.53**	**3.09**	2.23	9.85	88.9
D. 679/20	3.41	3.64	2.66	9.71	87.6
B.H. 10 (12)	**3.73**	**3.28**	**2.50**	**9.51**	**85.8**
D. 73/20	**3.89**	**3.32**	2.06	9.27	83.7
D. 53/27	**4.68**	**3.04**	1.47	9.19	82.9
D. 403/18	4.08	2.74	2.29	9.11	82.2
D. 689/13	**3.75**	**2.41**	1.86	8.02	72.4
Bourbon	3.06	3.02	1.32	7.40	66.8

Diamond 10, which continues to head the list, has been well tested, twelve plant cane, ten first ratoon and five second ratoon experiments having been harvested to date. This variety has many points in its favour. It yields rich juices of high sucrose content, high purity and low glucose ratio, ratoons sturdily (its second ratoon yield is 169.9 per cent. of that of D. 625) and loads well in the punts.

Seven plant cane, six first ratoon and one second ratoon experiments with P.O.J. 2878 have been reaped. The mean yields for plants and first ratoons exceed those of Diamond 10 by 8.6 and 16.5 per cent. respectively. In the single second ratoon trial so far reaped P.O.J. 2878 fell far short of the average second ratoon yield from Diamond 10, bringing the general average of P.O.J. 2878 for three crops to 4.3 per cent. below that of Diamond 10. It is not felt that the behaviour of P.O.J. 2878 in this single second ratoon trial is typical and it would not be surprising if the position of the two varieties is reversed when more second ratoon results are available for P.O.J. 2878. The Java cane germinates easily and ratoons vigorously. Planters report that, owing to rapid growth and heavy stooling, savings can be effected in the weeding expenses. The sucrose content and purity of the juice are high, the glucose ratio low. The two factories which have handled large quantities of this cane report no difficulties. Because of bristles on the leaf sheaths and the large number of canes per stool, cane cutters are somewhat shy of this variety. Puntloaders too have to be paid at a slightly higher rate for loading P.O.J. 2878 because it does not pack so well and the individual stalks are smaller, necessitating the handling of a greater number to get a given weight into the punt.

Several other varieties have surpassed the standard cane, D. 625, but, with the exception of D. 666/18, none has been tested sufficiently. D. 666/18 has been reaped in thirteen plant cane, eleven first ratoon and six second ratoon experiments. Over three crops, it will, in general, outyield D. 625, but its juice qualities are so unsatisfactory that it has not found general favour.

New experiments have been started with P.O.J. 2727, D. 927/22, D. 628/21, D. 203/20, D. 241/21, etc., and others will be started shortly. Pending confirmation by the results of these trials, it is possible, from the results of previous experiments and observations in the nursery, to give a few notes about these canes:—

P.O.J. 2727 is one of the thin Java canes, germinates readily and ratoons well. Its average yield in two plant cane tests has been 94.1 per cent. of that of D. 625, in three first ratoon tests 111.6 per cent., and in two second ratoon tests 175.2 per cent. Comparison of the glucose ratios indicates that this cane ripens better than D. 625.

D. 927/22, in two experiments, has outyielded D. 625 by 7.2 per cent. in the plants, 8.7 per cent. in the first ratoons, and 10.7 per cent. in the second ratoons. This is the result of heavier cane tonnages which are more than sufficient to offset a somewhat inferior juice.

D. 628/21 has been tested at Lusignan and Port Mourant. At Lusignan it outyielded D. 625 in all three crops. At Port Mourant the second ratoons have not yet been reaped, but D. 628/21 has led D. 625 in the plant canes and first ratoons. This cane has averaged the same purity, a slightly higher sucrose content and a better glucose ratio than D. 625.

D. 203/20, like D. 666/18, will outyield D. 625 over three crops because of heavier cane tonnages in the ratoons. The quality of the cane is inferior to that of D. 625.

D. 241/21 has been tested at Lusignan and Port Mourant. At the former place it did not do well but it appears to thrive under the conditions at Port Mourant, for on that estate, where D. 625 produces the highest yields in the Colony, it has led the standard cane by 1.28 tons sucrose per acre, over three crops. The sucrose content of this cane is about the same as that of D. 625, its purity slightly better and its glucose ratio considerably lower.

TABLE XXXVII.

Mean Sucrose Yields from Plant Canes and First Ratoons.

Variety.	Mean Sucrose, Tons per acre (Corrected Values),			Total yield, D. 625=100.0
	Plants.	First Ratoons.	Total.	
P.O.J. 2878	**5·70**	**4·99**	**10·69**	**126·8**
Co. 213	5.29	5.28	10.57	125.4
D. 747/13	5.84	4.11	9.95	118.0
D. 857/21	4.88	4.91	9.79	116.1
Diamond 10	**5·29**	**4·38**	**9·67**	**114·7**
Co. 210	5.08	4 32	9.40	111.5
Co. 281	4.66	4.56	9.22	109.4
D. 309/21	5.50	3.68	9.18	108.9
P.O.J. 253	4.71	4.37	9.08	107.7
D. 173/11	4.53	4.23	8.76	103.9
D. 11/28	**5·13**	**3·62**	**8·75**	**103·8**
D. 52/20	5.37	3.26	8.63	102.4
D. 444/21	4.76	3.83	8.59	101.9
D. 404/17	4.99	3.58	8.57	101.7
D. 625	**4·77**	**3·66**	**8.43**	**100·0**
D. 1/28	**4·49**	3.85	8.34	98.9
D. 195/17	4.95	3.37	8.32	98.7
Berbice	4.81	3.44	8.25	97.9
D. 880/21	4.50	3.74	8.24	97.7
D. 1431/22	4.88	3.35	8.23	97.6
D. 92/17	4.95	3.17	8.12	96.3
D. 744/21	4.70	3.30	8.00	94.9
D. 9/28	**4·46**	3.41	7.87	93.4
D. 4/28	**4·35**	**3·43**	**7·78**	**92·3**
G. 119	**4·11**	3.64	7.75	91.9
D. 71/20	4.66	3.02	7.68	91.1
D. 23/28	**4·13**	3.52	7.65	90.7
D. 593/22	4.74	2.77	7.51	89.1
D. 604/20	4.46	3.02	7.48	88.7
D. 383/21	4.03	3.39	7.42	88.0
D. 376/17	4.54	2.75	7.29	86.5
D. 794/18	4.10	3.17	7.27	86.2
D. 1175/22	3.89	3.37	7.26	86.1
D. 238/17	4.10	3.13	7.23	85.8
D. 3/28	**3·90**	**3·25**	**7·15**	**84·8**
D. 661/21	4.29	2.78	7.07	83.9
D. 309/22	4.48	2.53	7.01	83.2
D. 206/21	4.03	2.91	6.94	82.3
D. 1159/22	**4·06**	2.82	6.88	81.6
D. 789/18	4.12	2.75	6.89	81.5
D. 13/28	**4·08**	**2·76**	**6·84**	**81·1**
D. 163/21	4.32	2.49	6.81	80.8

TABLE XXXVII.

Mean Sucrose Yields from Plant Canes and First Ratoons—(Contd.)

Variety.	Mean Sucrose, Tons per acre (Corrected Values),			Total yield, D. 625=100.0
	Plants.	First Ratoons.	Total.	
D. 611/18	4.07	2.73	6.80	80.7
D. 73/17	3.94	2.85	6.79	80.5
D. 438/21	4.21	2.55	6.76	80.2
D. 15/28	**3.55**	**3.14**	**6.69**	**79.4**
D. 1221/22	3.99	2.68	6.67	79.1
Diamond 5	4.80	1.83	6.63	78.6
D. 75/20	3.94	2.69	6.63	78.6
D. 24/28	**3.72**	2.81	6.53	77.5
D. 349/20	3.94	2.58	6.52	77.3
D. 699/20	**4.04**	**2.40**	**6.44**	**76.4**
D. 10/28	**3.76**	2.47	6.23	73.9
D. 516/20	3.61	2.53	6.14	72.8
D. 918/22	3.60	2.08	5.68	67.4
D. 118/02	3.83	1.83	5.66	67.1
D. 571/20	**3.45**	**2.01**	**5.46**	**64.8**
B. 74	3.61	1.83	5.44	64.5
D. 613/21	**3.58**	1.83	5.41	64.2
I.C.T.A. 36	3.44	1.83	5.27	62.5
D. 8/27	3.36	1.75	5.11	60.6
D. 620/21	3.19	1.83	5.02	59.5

The outstanding cane in Table XXXVII is the thin Indian variety, Co. 213. It has been tried twice as a plant cane and twice as a first ratoon. The average first ratoon yield (5.3 tons sucrose per acre) was the same as the average yield from the plants. This cane, which germinates easily and stools prolifically, has very good juice characteristics. It has already been put into several new trials.

D. 747/13 is an old variety which had been lost at the Station but preserved at Pln. Blairmont. In two plant cane trials it has averaged 22.4 per cent. increase on the standard cane. As a first ratoon in one trial it gave a 12.2 per cent. increment over the first ratoon yield of D. 625 in the same field.

D. 309/21 has beaten D. 625 at Pln. Port Mourant where the standard cane does particularly well. It is now being tested elsewhere.

D. 11/28, which does not appear to be suited to Berbice, holds a low position in the list mainly on account of one unfavourable result at Pln. Port Mourant. Judged on the basis of four experiments carried out in the County of Demerara it would have been sixth instead of eleventh. This seedling has done particularly well at Uitvlugt where nurseries have been established for extension.

TABLE XXXVIII.

Mean Sucrose Yields from Plant Canes.

Variety.	Mean Sucrose, Tons per acre (Corrected Values).	Yield, D. 625=100.0
	Plants.	
D. 49/30	6.80	142.6
D. 66/30	6.21	130.2
D. 113/30	5.94	124.5
D. 170/30	5.90	123.7
D. 171/29	5.90	123.7
D. 67/30	5.71	119.7
P.O.J. 2878	**5.70**	**119.5**
D. 173/30	5.68	119.1
D. 232/30	5.68	119.1
D. 75/30	5.49	115.1
Diamond 10	**5.29**	**110.9**
D. 39/30	5.21	109.2
D. 84/30	5.16	108.2
D. 164/30	5.08	106.5
D. 74/30	5.06	106.1
D. 79/30	5.05	105.9
D. 150/30	5.05	105.9
D. 87/27	5.05	105.9
D. 88/30	5.04	105.7
D. 151/30	5.02	105.2
D. 103/30	5.01	105.0
D. 165/30	4.98	104.4
D. 51/30	4.98	104.4
D. 235/30	4.95	103.8
D. 205/30	4.95	103.8
D. 71/30	4.95	103.8
D. 81/30	4.92	103.1
D. 167/30	4.88	102.3
D. 52/30	4.83	101.3
D. 11/24	4.82	101.0
D. 57/27	4.80	100.6
D. 147/30	4.80	100.6
D. 78/30	4.79	100.4
D. 625	**4.77**	**100.0**
D. 182/30	4.72	99.0
D. 548/21	4.66	97.7
D. 223/30	4.65	97.5
D. 178/30	4.64	97.3
D. 160/30	4.60	96.4
D. 221/30	4.58	96.0
D. 85/30	4.57	95.8
D. 168/30	4.56	95.6

TABLE XXXVIII.

Mean Sucrose Yields from Plant Canes—(Contd.).

Variety.	Mean Sucrose, Tons per acre (Corrected Values).	Yield, D. 625=100.0
	Plants.	
D. 222/30	4.53	95.0
D. 149/30	4.52	94.8
D. 224/30	4.52	94.8
D. 50/28	4.50	94.3
D. 8/30	4.49	94.1
D. 682/20	4.45	93.3
D. 50/30	4.38	91.8
D. 62/30	4.36	91.4
D. 146/30	4.35	91.2
D. 190/30	4.34	91.0
D. 48/30	4.32	90.6
D. 20/28	4.32	90.6
D. 83/30	4.31	90.4
D. 174/30	4.30	90.1
D. 43/30	4.28	89.7
D. 72/30	4.28	89.7
D. 154/28	**4.21**	**88.3**
D. 218/30	4.18	87.6
D. 142/30	4.15	87.0
D. 136/30	4.12	86.4
D. 237/30	4.06	85.1
D. 148/30	4.04	84.7
D. 3/30	4.04	84.7
D. 47/30	4.00	83.9
D. 8/28	3.87	81.1
D. 181/30	3.85	80.7
D. 138/30	3.84	80.5
D. 41/30	3.83	80.3
D. 10/30	3.83	80.3
D. 220/30	3.80	79.7
D. 36/30	3.80	79.7
D. 215/30	3.79	79.5
D. 64/30	3.79	79.5
D. 7/30	3.78	79.2
D. 87/30	3.78	79.2
D. 54/30	3.68	77.1
D. 236/30	3.61	75.7
D. 89/30	3.61	75.7
D. 31/30	3.59	75.3
D. 14/30	3.57	74.8
D. 143/30	3.56	74.6
D. 1/30	3.48	73.0

TABLE XXXVIII.

Mean Sucrose Yields from Plant Canes—(Contd.).

Variety.	Mean Sucrose, Tons per acre (Corrected Values)	Yield, D. 625=100.0
	Plants.	
D. 157/30	3.44	72.1
D. 230/30	3.44	72.1
D. 76/02	3.44	72.1
D. 2/30	3.43	71.9
D. 152/30	3.37	70.6
D. 246/20	3.34	70.0
D. 13/30	3.13	65.6
D. 63/30	3.11	65.2
D. 179/30	3.10	65.0
D. 231/30	3.07	64.4
D. 5/30	2.59	54.3
D. 6/28	2.39	50.1
D. 45/30	2.35	49.3
D. 46/30	2.12	44.4

Not much is known about the canes listed in Table XXXVIII. They have only been reaped as plant canes, and, with few exceptions, only once. Six have surpassed the average plant cane yield of P.O.J. 2878, nine that of Diamond 10, and thirty-one that of D. 625. Twenty-seven of these last were bred as recently as December 1930, and it is an indication of their good field qualities that results from replicated tests with them are already available.

It may be of interest to record here the parentage of the first twelve of these new seedlings :—

Seedling.	*Parents.*
D. 49/30	D. 625
D. 66/30	Diamond 10 x S.C. 12/4
D. 113/30	D. 238/17 x S.C. 12/4
D. 170/30	D. 145
D. 171/29	P.O.J. 2725
D. 67/30	Diamond 10 x S.C. 12/4
D. 173/30	D. 145
D. 232/30	S.C. 12/4
D. 75/30	Badila x D. 625
D. 39/30	D. 238/17 x S.C. 12/4
D. 84/30	Badila x D. 625
D. 164/30	D. 145

The yields given by D. 49/30 and D. 66/30 were, respectively, 142.6 and 130.2 per cent. of that of D. 625. Few, if any, canes previously tested here have

reached anywhere near this position in relation to the standard variety and since these two seedlings germinate easily and have ratooned well in the nurseries it is hoped that they will maintain their early promise. They are both canes of high sucrose content, yielding juices of high purity and low glucose ratio.

In Table XXXIX the main characteristics of some of the more promising varieties are compared on a percentage basis.

TABLE XXXIX.

Comparison of Some of the Better Varieties (D.625 = 100.0).

Variety.	Yield of Sucrose in Cane per Acre.			Plant Canes.		
	Plant Canes.	First Ratoons.	Second Ratoons.	Sucrose per cent. Cane.	Juice Purity.	Glucose Ratio.
D. 625	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Diamond 10	111.0	119.8	169.9	117.6	107.4	45.1
P.O.J. 2878	119.6	136.3	113.2	112 5	105.8	58.8
P.O.J. 2727	94.1	111.6	175.2	93.9	100.6	85.7
D. 927/22	107.2	108.7	110.9	90.5	98.1	154.9
D. 628/21	104.7	110.5	108.7	100.4	100.0	87.6
D. 666/18	98.3	105.3	111.4	95.2	98.6	95.4
D. 203/20	92.5	104.7	115.3	90.8	98.5	106.6
D. 241/21	106.0	93.8	106.1	99.6	101.8	76.8
Co. 213	110.8	144.2		118.6	114.1	44.0
D. 747/13	122.4	112.2		103.4	102.5	92.7
D. 857/21	102.4	134.1		108.2	104.0	82.1
Co. 210	106.5	118.1		110.3	111.9	46.4
Co. 281	97.8	124.5		130.7	120.3	25.5
D. 309/21	115.4	100.6		107.7	103.2	56.3
D. 11/28	107.6	98.9		102.2	103.7	68.5
P.O.J. 2753		139.8		*97.0	103.3	75.2
D. 49/30	142.5			104.4	104.6	72.8
D. 66/30	130.2			104.8	105.6	50.2
D. 113/30	124.6			90.8	97.6	129.0
D. 170/30	123.6			91.5	98.6	104.8
D. 171/29	123.6			93.5	96.5	102.7
D. 67/30	119.7			112.4	104.8	61.5
D. 173/30	119.0			103.7	105.4	61.7
D. 232/30	119.0			101.5	103.8	62.2
D. 75/30	115.1			93.7	98.1	155.1

It is evident that Diamond 10 and P.O.J. 2878 have maintained their early promise. Estate experience with these canes on a large scale is rapidly confirming the experimental results and planters are advised to continue and accelerate their extension.

*From analyses of First Ratoons.

The performance of these two varieties has altered considerably the goal of the cane breeding work. In 1929, when the Station was re-organised, all efforts were bent on finding (among the large number of seedlings at the station), breeding or introducing a cane which would equal or surpass D. 625, a variety which has dominated the plantings for long years. Despite the fact that the output per acre from D. 625 has increased and continues to increase, it was felt unsafe to have the industry dependent on a single variety, and it was hoped that the search might reveal a cane which would yield more in the field and/or have better juice characteristics than the standard cane which, in this latter respect, leaves much to be desired.

The search has revealed :—

(a) One locally bred (by Pln. Diamond) and one imported seedling (P.O.J. 2878) which definitely outyield D. 625 by about 25 per cent.;

(b) A number of locally bred and introduced canes which, though not yet fully tested, seem destined to outyield the standard cane by increments varying from 5 to 25 per cent.;

(c) A batch of new seedlings which in their first test have outyielded D. 625 by varying amounts up to 42 per cent.

As already intimated, the yield of sugar per acre in this Colony is improving. Indeed, with an average of 2.93 tons per English acre for the spring crop of 1935, British Guiana has outstripped most sugar-producing countries, for that figure includes data from several small and inefficient concerns, and is derived from plant canes, first ratoons and second ratoons in about equal quantities and a smaller proportion of older ratoons. D. 625, covering over 60 per cent. of the area reaped, was the principal cane contributing to this result.

But the task of the Station is no longer to find a cane to surpass D. 625, but one to surpass Diamond 10 and P.O.J. 2878 which, with present cultural and manufacturing methods, should take the average yield to over 3.5 tons raw sugar per acre. The first three lines in Table XXXIX indicate the considerably higher level now set.

The breeding of new varieties is one thing, their testing and selection quite another ; there are few tasks more difficult and more time-consuming. It is fortunate that after six years it is possible definitely to advise planters to extend two canes which are likely to add 25 per cent. to the yield.

The data presented in the preceding pages give the assurance that other canes beside Diamond 10 and P.O.J. 2878 could replace D. 625 with advantage if these two were not available, and the first tests with certain new seedlings augur the early displacement of Diamond 10 and P.O.J. 2878 by still better varieties.

MANURIAL TRIALS.

This section, dealing with the results of seventeen manurial trials reaped during the year ended June 30, 1935, is divided into four sub-sections, *viz.*, (A) trials with nitrogenous manures, (B) trials with lime-bearing materials, (C) trials with phosphatic manures and (D) discussion and summary of the results obtained.

Samples of cane have, with a single exception, been collected from each plot of every experiment and have been carefully examined in the laboratory at the Sophia Experiment Station. As will be seen later, they continue to show that fertiliser applications may have considerable effects upon the quality of the cane.

The monthly rainfall experienced at the trial sites is given in Appendix I where comparison is made with the monthly rainfall usually observed.

The results of the detailed laboratory examination of composite soil and subsoil samples from the various experimental areas are recorded in Appendix II.

A calendar of the agricultural operations carried out on the manurial trials is given in Appendix III.

SUB-SECTION A.— EXPERIMENTS WITH GRADED DRESSINGS OF NITROGENOUS MANURES.

(A1—A4) Sulphate of Ammonia on Flood-Fallowed Frontland Soils (First Ratoons).

(*Plant cane results reported in Sugar Bull. No. 3, pp. 79-84.*)

These four trials constitute a chain of four 4 x 4 latin squares designed to determine the optimum dressing of sulphate of ammonia on the standard cane variety growing on flood-fallowed frontland soils. As plant canes the trials indicated 2 cwt. sulphate of ammonia per acre as the optimum dose.

The first ratoon plots were given the same doses of sulphate of ammonia they received as plants.

The individual results of the four trials are presented in Table XL.

TABLE XL.

Effect of Sulphate of Ammonia on First Ratoons of D. 625 growing on Flood-fallowed Frontland.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
Pln. Port Mourant, Field 4 House End, Port Mourant Emp polder.					
0	22.79	13.70	3.12	88.1	5.72
2	36.50	13.32	4.86	87.6	5.31
4	47.97	13.51	6.48	87.8	5.84
6	50.37	13.32	6.71	87.9	6.40
Means	39.41	13.46	5.30	87.8	5.82
Pln. Rose Hall, Field 30 Rose Hall.					
0	34.98	14.49	5.07	88.8	7.77
2	38.36	14.71	5.64	89.3	6.14
4	43.70	14.76	6.45	89.1	6.82
6	47.29	13.81	6.53	87.3	8.43
Means	41.08	14.44	5.93	88.6	7.29
Pln. Enmore, Field 8 Bachelor's Adventure.					
0	23.84	14.17	3.38	87.8	7.30
2	31.77	14.42	4.58	87.2	8.17
4	36.49	14.23	5.19	86.9	8.24
6	39.68	14.01	5.56	86.0	9.55
Means	32.94	14.21	4.68	87.0	8.31
Pln. Lusignan, Field 28 East, Good Hope.					
0	29.89	12.04	3.60	83.1	10.45
2	35.80	11.59	4.15	80.5	14.67
4	43.37	11.20	4.86	79.0	15.71
6	44.45	10.98	4.88	79.3	15.62
Means	38.38	11.45	4.39	80.5	14.11

The soils of these sites have been discussed in *Sugar Bulletin* No. 3, pp. 80-81.

All of the experiments received considerably less rainfall than might have been expected, the total deficits being as follows :— Port Mourant 14.90 in.; Rose Hall 8.92 in.; Enmore 18.65 in.; Lusignan 20.76 in. Precipitation was particularly low in the first months of growth (March to June 1934) and again when the canes were about 10 to 11 months old, *i.e.*, in December 1934 and January 1935.

The combined first ratoon results of the four latin squares are presented in Table XLI, and are shown graphically in Figure XXXIX where the plant cane results are also shown for ease of comparison.

TABLE XLI.

Effect of Sulphate of Ammonia on First Ratoons of D. 625 on Flood-fallowed Frontland Soils (Combination of four experiments).

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	27.87	13.60	3.792	86.96	7.81
2	35.61	13.51	4.811	86.16	8.57
4	42.88	13.43	5.759	85.72	9.16
6	45.45	13.03	5.922	85.12	10.00
Means	37.95	13.39	5.083	85.99	8.88
S.E. of means	1.672	0.120	0.224	0.367	0.636
Significant Differences (20 : 1)	5.35	0.35	0.716	1.06	2.03

'Z' value obtained for effect of nitrogen on tons cane per acre	=2.1002
" " " " " " " " sucrose content of cane	=0.7386
" " " " " " " " juice purity	=0.7448
" " " " " " " " glucose ratio	=0.8269
" " " " " " squares (tons cane)	=1.2909
" " " " " " " (sucrose content of cane)	=2.4230
" " " " " " " (juice purity)	=2.3216
" " " " " " " (glucose ratio)	=2.1950
" " required for P =0.05	=0.5508
" " " " P =0.01	=0.7757

The dressings of sulphate of ammonia have had a definite effect upon the yield of cane, the sucrose content, the glucose ratio and juice purity.

There has also been a definite effect on tonnage, sucrose content, juice purity and glucose ratio due to location of the latin squares. Thus it seems that sulphate of ammonia is more effective at Port Mourant than at the other three sites. The yield curves for Rose Hall and Enmore are almost linear while those for the other two sites show a distinct flattening when the application exceeds 4 cwt. per acre. At Port Mourant, Rose Hall and Enmore the treatments had only a slight effect on the glucose ratio whereas at Lusignan there was a considerable effect on the maturity of the cane.

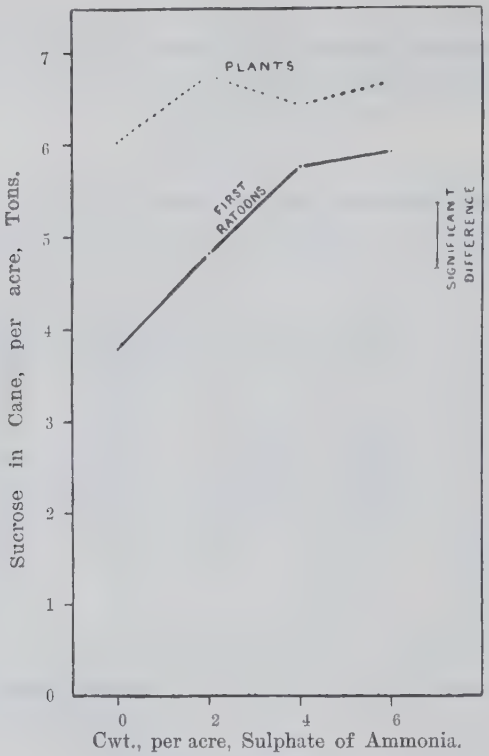

FIG. XXXIX.

Effect of Sulphate of Ammonia on Flood-fallowed Frontland Soils (Plant Canes and First Ratoons).

Conclusions:— The following general conclusions, referring to first ratoons of D. 625 on flood-fallowed frontland, may be drawn from these results:—

(a) The effect of 'squares', *i.e.*, the effect of environment and/or age of cane is very definite on tonnage, sucrose content, juice purity and glucose ratio.

(b) As far as tonnage is concerned, a dressing of sulphate of ammonia at the rate of 2 cwt. per acre gives an increased yield of 7.74 tons of cane per acre (20.4 per cent. of the mean). An application at the rate of 4 cwt. per acre gives an increased yield over the control of 15.01 tons of cane per acre (39.5 per cent. of the mean). An application at the rate of 6 cwt. per acre gives no further significant increase. The applications of sulphate of ammonia have different effects on different areas of soil or under differing climatic conditions.

(c) The sucrose content of the cane is not definitely affected by applications of sulphate of ammonia at the rate of 2 cwt. and 4 cwt. per acre. A dressing at the rate of 6 cwt. per acre causes a significant reduction of 0.57 per cent. (4.3 per cent. of the mean) in the sucrose content.

(d) As regards juice purity, a dressing of sulphate of ammonia at the rate of 2 cwt. per acre has no definite effect. An application at the rate of 4 cwt. per acre definitely decreases the juice purity as compared with that obtained from the control plots. There is no definite difference in juice purity as regards the 2 cwt. and the 4 cwt. applications. A dressing at the rate of 6 cwt. per acre gives a definitely lower juice purity than that of the control plots, but it does not differ significantly from that obtained from the 2 cwt. and 4 cwt. plots.

(e) Dressings of sulphate of ammonia at the rates of 2 cwt. and 4 cwt. per acre have no definite effect upon the glucose ratio. An application at the rate of 6 cwt. has a definite adverse effect.

(f) The most important value from the economic standpoint is the yield of sucrose per acre. An application of sulphate of ammonia at the rate of 2 cwt. per acre is responsible for an increase of 1.019 tons of sucrose per acre (20.0 per cent. of the mean). A dressing at the rate of 4 cwt. per acre brings about an increase of 1.967 tons of sucrose per acre (38.7 per cent. of the mean). An application at the rate of 6 cwt. gives no further increment in yield.

(A5) Sulphate of Ammonia on Flood-fallowed Frontland (Pln. Uitvlugt, Field 14 Zeeburg, First Ratoons).

(*Plant cane results reported in Sugar Bull. No. 3, p. 82*)

As a plant cane this trial formed part of the chain just discussed. Owing to an oversight, the estate authorities applied a basic dose of 1.5 cwt. of sulphate of ammonia to all the first ratoon plots. In consequence there are no control plots, and comparisons have to be made between applications of 1.5, 2, 4 and 6 cwt. The results obtained are presented in Table XLII.

Table XLII.

Effect of Sulphate of Ammonia on Flood-fallowed Frontland (Pln. Uitvlugt, First Ratoons).

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
1.5	35.98	12.62	4.47	85.6	9.50
2	38.31	12.78	4.75	85.7	9.25
4	45.31	12.00	5.62	84.5	9.80
6	45.72	12.24	5.67	83.7	11.77
Means	41.33	12.41	5.13	84.9	10.08
S.E. of treatment means	1.14				
Significant Difference (20 : 1)	3.93				

'Z'	value	obtained	for	effect	of	nitrogen	on	tons cane per acre	=1.4666
,,	,,	,,	,,	,,	,,	,,	,,	sucrose content of cane	=0.0402
,,	,,	,,	,,	,,	,,	,,	,,	juice purity	=0.2544
,,	,,	,,	,,	,,	,,	,,	,,	glucose ratio	=0.3078
,,	,,	required	for	P = 0.05					=0.7798
,,	,,	,,	,,	P = 0.01					=1.1401

The soil of this area has already been discussed on page 82 of *Sugar Bulletin* No. 3.

The first ratoons received abnormally low rainfall during 9 out of the 12 months' growing period, with a total deficiency of 17.12 in.

The dressings of sulphate of ammonia have had a definite effect upon the yield of cane but the differences in the sucrose content, juice purity and glucose ratio are not statistically significant. The column headed "Sucrose, Tons/acre" in Table XLII has therefore been obtained by multiplying the cane yields of the indivdual treatments by the mean sucrose per cent. cane for the whole experiment.

Conclusions :— Under the conditions of the experiment :—

(a) A dressing of sulphate of ammonia at the rate of 2 cwt. per acre does not give a significantly higher cane yield than a dressing of 1.5 cwt. per acre ; a dressing of 4 cwt. per acre gives a definitely higher cane yield than a dressing of 1.5 or 2 cwt. There is no difference in the yields from the 4 cwt. and 6 cwt. applications.

(b) The various dressings of sulphate of ammonia have had no definite effect upon the sucrose content of the cane, the juice purity or the glucose ratio.

(A6-A7) Sulphate of Ammonia on Pegassy Clay Soils (Plant Canes).

This is a chain of 5 x 5 latin squares designed to determine the optimum dressing of sulphate of ammonia for the variety D. 625 growing on pegassy clay soils, *i.e.*, on soils of abnormally wide carbon:nitrogen ratio. The chain consists of five latin squares. The plant cane results from three of the squares, a discussion of the soil of the experimental sites, etc., were given in *Sugar Bulletin* No. 3, pp. 97-100. The individual results from the remaining two trials and the combined data from all five squares are presented and discussed below.

TABLE XLIII.

Effect of Sulphate of Ammonia on Plant Canes of D. 625 on Pegassy Clay Soil.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
	Pln.	*Cane Grove, Field 63 Melville.*			
0	31.38	13.63	4.28	86.9	12.75
2	38.26	13.53	5.18	86.1	13.00
4	38.67	13.10	5.07	83.4	16.69
6	45.00	13.30	5.98	84.5	16.30
8	42.73	13.15	5.62	83.7	16.34
Means	39.21	13.34	5.23	84.9	15.02
		Pln. Wales, Field 9 Cottage.			
0	28.92	13.44	3.89	87.7	8.51
2	32.85	13.16	4.32	86.6	8.75
4	33.78	13.51	4.56	87.7	8.51
6	39.52	13.47	5.32	87.2	8.18
8	41.21	13.22	5.45	86.8	9.27
Means	35.26	13.36	4.71	87.2	8.64

The experiment in Field 63 Melville, Pln. Cane Grove, was situated on a highly acid pegassy clay, overlying a similar subsoil. The organic matter content is above the average and the carbon : nitrogen ratio very wide. The theoretical lime requirement is high. The salinity of the topsoil is normal but that of the subsoil is much above the average.

The trial in Field 9 Cottage, Pln. Wales, was situated on a markedly acidic pegassy clay soil and subsoil whose organic matter content is below the average for this type of soil. The carbon : nitrogen ratio is wide and the theoretical lime requirement high. The salinity is above the average.

Rainfall was deficient at both experimental sites, being 25.36 in. below normal at Cane Grove for the growing period, and 23.99 in. below at Wales. The monthly precipitation was subnormal at both estates in 10 out of the 13 months the canes were growing, only exceeding the normal in July and October 1934, and in February 1935.

The combined results of the five latin squares are presented in Table XLIV.

Figure XL shows the results for plants and first ratoons of all the nitrogen trials reaped on pegassy clay soils. The plant cane line is derived from the five latin squares under discussion and a complicated trial reaped in Field 86 G.D.,

Pln. Farm (see *Sugar Bulletin* No. 1, pp. 57-60, *Sugar Bulletin* No. 2, pp. 34-37 and *Sugar Bulletin* No. 3, pp. 100-102). The first ratoon line is derived from the last-named trial and three latin squares at Lusignan, Versailles, and Uitvlugt (A8-A10) to be discussed under the next sub-head.

TABLE XLIV.

Effect of Sulphate of Ammonia on Plant Canes of D. 625 on Pegassy Clay Soils (Combination of five Experiments).

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	28.50	13.40	3.776	87.06	11.29
2	31.70	13.32	4.200	86.25	11.39
4	32.76	13.29	4.341	86.16	12.28
6	36.90	13.26	4.889	86.08	12.88
8	37.26	12.98	4.937	85.70	13.65
Means	33.43	13.25	4.429	86.25	12.30
S.E. of treatment means	0.78				0.55
Significant Differences (20: 1)	2.25				1.59

'Z' value obtained for effect of nitrogen on yield of cane	=1.5479
" " " " " " " " sucrose content of cane	=0.3079
" " " " " " " " juice purity	=0.4016
" " " " " " " " glucose ratio	=0.5934
" " " " " " squares (tons cane)	=2.6426
" " " " " " " (sucrose content of cane)	=1.3785
" " " " " " " (juice purity)	=1.4737
" " " " " " " (glucose ratio)	=1.7099
" " required for P =0.05	=0.4632
" " " " P =0.01	=0.6472

The dressings of sulphate of ammonia have had a definite effect upon the weight of cane and the glucose ratio. The effect of 'squares', *i.e.*, location, age environment, etc., has been significant on tons cane, sucrose content of cane, juice, purity and glucose ratio.

The effect of treatments on the yield of cane has been most marked at Cane Grove and Wales. At Lusignan there was hardly any effect. The effect of the applications on the glucose ratio was most notable at Lusignan, Versailles and Cane Grove. The drop in purity coincident with increasing the dose of sulphate of ammonia was most obvious at Cane Grove.

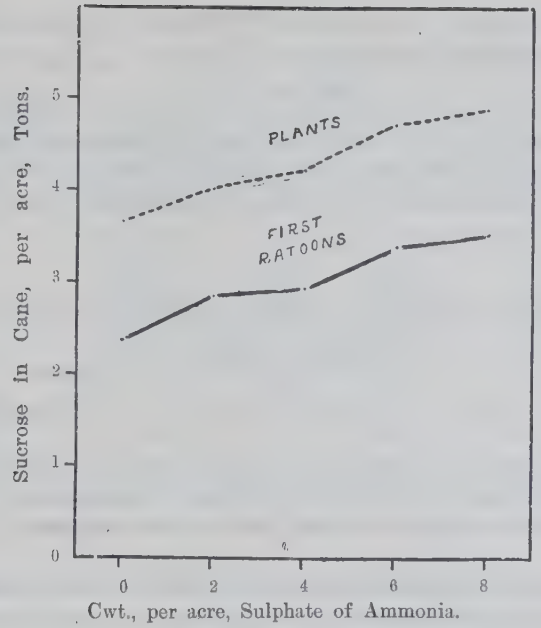

FIG. XL.

Effect of Sulphate of Ammonia on Pegassy Clay (Plant Canes and First Ratoons).

Conclusions : — The following general conclusions, referring to plant canes of D. 625 on pegassy clay soil, may be drawn from the results of these experiments :—

(a) The effect of 'squares', *i.e.*, the effect of environment and/or age of cane is very definite on tonnage, sucrose content, juice purity and glucose ratio.

(b) As far as cane tonnage is concerned, a dressing of sulphate of ammonia at the rate of 2 cwt. per acre gives an increase in yield of 3.2 tons (9.6 per cent.) over the control. An application at the rate of 4 cwt. per acre does not give any definite further increase. A 6 cwt. application gives an increase of 4.14 tons (12.4 per cent.) over the yield from a 4 cwt. application.

(c) The sucrose content of the cane is not definitely affected by applications of sulphate of ammonia of the order tried.

(d) The juice purity is not definitely affected by applications of sulphate of ammonia of the order tried.

(e) As regards the glucose ratio, a gauge of the maturity of the cane, dressings of 2 and 4 cwt. per acre of sulphate of ammonia have no definite effect, but applications of 6 and 8 cwt. per acre have a significantly adverse effect as compared with plots receiving no sulphate of ammonia.

(A8-A10) Sulphate of Ammonia on Pegassy Clay Soils (First Ratoons).

(*Plant cane results reported in Sugar Bull. No. 3, pp. 97-100.*)

These three trials form part of a chain of five latin squares laid down on pegassy clay to determine the optimum nitrogen requirements of D. 625. The plant cane results from the five squares have just been discussed.

Owing to two inadvertent mistakes by the estates' staffs concerned, it will be impossible to combine the results of the three first ratoon trials so far reaped. At Versailles a basic application of 1.5 cwt. sulphate of ammonia was given to the entire experimental area. While it was possible to bring the 2, 4, 6 and 8 cwt plots up to the required dosage after the experiment had to be carried through without any no-nitrogen plots. At Uitvlugt one complete block of the square was reaped before the plot weights could be taken, automatically converting the trial from a latin square to a randomised block. Figure XL, however, shows the results for plants and first ratoons of all the nitrogen trials reaped on pegassy clay soil. The first ratoon line is derived from the three trials under discussion and from a complicated trial reaped in Field 86 G.D., Pln. Farm (see *Sugar Bulletin* No. 1, pp. 57-60, No. 2, pp. 34-37 and No. 3, pp. 100-102).

The soils of the three experimental sites have been already described on pp. 97-98 of *Sugar Bulletin*, No. 3.

(*A8*) *Pln. Lusignan, Field 4 East, Lusignan Empolder* (*First Ratoons*).

The results obtained at Pln. Lusignan appear in Table XLV.

The experiment received 17.1 in. less rainfall than might have been expected, the precipitation being subnormal for 9 out of the 12 months of growth. There was an excess of 3.66 in. during the month preceding reaping. This may account for the rather high glucose ratios.

TABLE XLV.

Effect of Nitrogen on First Ratoons of D. 625 on a Pegassy Clay, at Pln. Lusignan.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	28.38	11.93	3.39	81.6	13.65
2	35.62	11.28	4.02	79.0	17.48
4	35.86	10.80	3·87	76.8	20.49
6	39.87	10.93	4.36	76.0	21.53
8	40.04	10.82	4.33	76.2	22.15
Means	35.95	11.15	4.01	77.9	19.06
S.E. of treatment means	1.66	0.23	0.185	0.74	1.44
Significant Differences (20 : 1)	5.40	0.76	0.602	2.42	4.69

'Z' value obtained for effect of nitrogen on tons cane per acre =1.0485
" " " " " " " " sucrose content of cane =0.7168
" " " " " " " " juice purity =1.1698
" " " " " " " " glucose ratio =0.8927
" " required for P = 0.05 =0.5907
" " " " P = 0.01 =0.8443

The various dressings have had a definite effect upon the yield of cane, its sucrose content, the juice purity and the glucose ratio.

Conclusions :— Under the conditions of the experiment :—

(a) In regard to the yield of cane, a dressing of 2 cwt. per acre of sulphate of ammonia produces a significant increase of 7.24 tons (20.1 per cent.) over the control. A dressing of 4 cwt. gives no further increase in yield. A dressing of 6 cwt. gives an increase of 4.25 tons (11.8 per cent.) over the yield from the 2 cwt. plots. While this increment is not statistically significant in this experiment, it is similar to the increments observed in other nitrogen trials on pegasse soils.

(b) In regard to the sucrose content of the cane, a dressing of 2 cwt. has no significant effect, but dressings of 4, 6 and 8 cwt. per acre produce canes of lower sucrose content than if no nitrogen is given. There is no significant difference between the effects on sucrose per cent. cane of the various levels of nitrogen applied.

(c) In regard to juice purity, dressings of 2 cwt. yield juices of lower purity (2.6 points) than that of the control plots, while the juices from the 6 and 8 cwt. dressings are definitely lower in purity (by 3.0 and 2.8 points, respectively) than those from the 2 cwt. plots.

(d) In regard to glucose ratio, the increase of 3.83 points due to an application of 2 cwt. per acre of sulphate of ammonia is not statistically significant but dressings of 4, 6 and 8 cwt. per acre have (as compared with the control plots) a definite effect in retarding maturity.

(A9) Pln. Versailles, Field 31, R.D.Z.

The results obtained at Pln. Versailles are to be found in Table XLVI.

The rainfall on this experiment was below normal for nine out of the twelve months of growth. The total deficit amounted to 19.97 in. Just before reaping there was excessive rainfall and, as in the preceding experiment, glucose ratios were high.

TABLE XLVI.

Effect of Nitrogen on First Ratoons of D. 625 on a Pegassy Clay at Pln. Versailles.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
1.5	22.44	12.34	2.67	82.0	15.13
2	22.92	12.13	2.73	81.7	14.57
4	24.92	12.10	2.97	81.2	16.22
6	28.66	11.47	3.41	78.2	19.85
8	27.87	11.48	3.32	77.8	19.64
Means	25.36	11.90	3.02	80.2	17.08
S.E. of treatment means	1.07		0.127	1.12	
Significant Differences (20 : 1)	3.30		0.393	3.45	

'Z' value obtained for effect of nitrogen tons cane per acre =0.9682
" " " " " " " sucrose content of cane =0.4162
" " " " " " " juice purity =0.6022
" " " " " " " glucose ratio =0.5478
" " required for P = 0.05 =0.5907
" " " " P = 0.01 =0.8443

The sulphate of ammonia dressings have had a definite effect upon the yield of cane and the juice purity.

Conclusions :— Under the conditions of the experiment :—

(a) In regard to the yield of cane, the returns from dressings of 2 and 4 cwt. do not differ significantly from that of the 1.5 cwt. dressing. A dressing of 6 cwt. per acre of sulphate of ammonia gives a definitely higher yield than do dressings of 1.5, 2 or 4 cwt. Increasing the sulphate of ammonia application to 8 cwt. does not produce any further increment in yield.

(b) The juice purities from applications of 1.5, 2 and 4 cwt. per acre are substantially the same. The purities from the 6 and 8 cwt. applications are, however, definitely lower than those from the three smaller doses.

(A10) Pln. Uitvlugt, Field 94 Met-en-Meerzorg.

Table XLVII shows the results obtained at Pln. Uitvlugt.

In its first two months of growth the experiment received a great excess of rain, but subsequently the rainfall tended to be subnormal, except in the month of October 1934, two months before reaping, when the fall exceeded the average by 7.12 in.

TABLE XLVII.

Effect of Nitrogen on First Ratoons of D. 625 on a Pegassy Clay at Pln. Uitvlugt.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	12.05	12.18	1.42	81.7	11.44
2	16.55	12.18	1.96	81.6	12.03
4	18.57	11.67	2.19	79.3	12.91
6	24.49	11.66	2.89	77.0	14.86
8	25.14	11.39	2.97	78.6	14.06
Means	19.36	11.82	2.29	79.6	13.06
S.E. of treatment means	1.61		0.190		
Significant Differences (20 : 1)	5.58		0.660		

'Z' value obtained for effect of nitrogen on tons cane per acre =1.2312
" " " " " " " " sucrose content of cane =negative
" " " " " " " " juice purity =0.2169
" " " " " " " " glucose ratio =0.1869
" " required for P = 0.05 =0.5907
" " " " P = 0.01 =0.8443

The sulphate of ammonia treatments have had a definite effect upon the tons cane per acre.

Conclusions :— Under the conditions of the experiment :—

(a) The increase of 4.50 tons of cane given by the 2 cwt. application is not statistically significant, but that given by the 4 cwt. application (6.52 tons) is. A dressing of 6 cwt. gives a yield significantly better (increment of 5.92 tons) than that of the 4 cwt. dressing which it exceeds by 30.6 per cent.

SUB-SECTION B.—EXPERIMENTS WITH LIME-BEARING MATERIALS.

(B1) Ground Limestone and Slaked Lime in the Row on Pegassy Clay (Pln. Uitvlugt, Second Ratoons).

(*Plant cane results reported in Sugar Bull. No. 1, pp. 73—76.*)
(*First Ratoon results reported in Sugar Bull. No. 3, pp. 111—112.*)

This experiment involves graded dressings of ground limestone and slaked lime. The applications were made at planting and the results here reported refer to the possible residual effects upon the second ratoon crop and the total effect over three crops.

Rainfall was excessive from the second to the fifth month of growth, inclusive, and slightly superior to the average in the eleventh month. During the rest of the growing period precipitation was subnormal.

The yields of the second ratoon crop, and for the three crops combined, are presented in Table XLVIII.

TABLE XLVIII.

Effect of Graded Dressings of Lime and Limestone on Pegassy Clay at Pln. Uitvlugt.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.		Sucrose. Tons/acre,	
		Second Ratoons.	Three Crops.	Second Ratoons.	Three Crops.
Control	nil	14.95	61.98	2.01	8.65
Slaked lime	1	15.56	65.42	2.09	9.18
,, ,,	2	15.92	66.80	2.14	9.36
,, ,,	5	15.18	65.37	2.04	9.18
Ground limestone	1	14.93	63.93	2.01	8.97
,, ,,	2	15.72	65.57	2.11	9.21
,, ,,	5	15.45	65.49	2.08	9.22
Means		15.39	64.94	2.07	9.11

It was not possible to examine cane samples collected from every plot of this experiment but bulked samples, representative of each treatment, were analysed at the Sophia Experiment Station. The general mean analytical figures obtained for the second ratoons were :—

Percentage of sucrose in cane	13.44
Purity	89.8
Glucose ratio	6.10

Conclusions :—

(a) Considering the second ratoon results by themselves, the treatments show no definite effect upon the yield.

(b) Considering the total yield for three crops, the application of lime-bearing materials has a definite effect on yield, increasing the total output for the complete cycle by 3.45 tons cane (0.54 ton sucrose) per acre. No definite difference is demonstrated between the effects of slaked lime and ground limestone or between the differents levels of these amendments.

SUB-SECTION C.— TRIALS WITH PHOSPHATIC MANURES.

Two chains of experiments each containing three 5 x 5 latin squares, were reaped during the period under review. One chain (C1—C3) aimed at determining the most suitable form of phosphatic fertiliser, while the other (C4—C6) was designed to assess the most paying quantity of phosphate to use and the best method of application.

(C1—C3) Comparison of The Effect of Various Sources of Phosphate (Plant Canes).

The treatments used in these tests were :—

Nicifos (Type B, 18% N, 18% P_2O_5) 3 cwt. per acre

Preciphos (44.6% P_2O_5)	1.5	„	„	„	Basic dressing of 2.5 cwt. per acre of sulphate of ammonia.
Basic Slag (18.4% P_2O_5)	5	„	„	„	
Superphosphate (18.5% P_2O_5)	3	„	„	„	
Control			—		

The trial in Field 19 L. 20, Pln. Rose Hall, was situated on a markedly acidic clay overlying a slightly acidic subsoil of similar texture. Whereas the organic

matter content and carbon:nitrogen ratio of the site are normal, the theoretical lime requirement is high and the salinity much above the average.

Rainfall was above the normal for the first three months of growth, then for five months it was well below the average, improving again in the later period of growth. There was a total excess of 11.84 in. over the average which, in view of the distribution, was probably more harmful than otherwise.

The trial in Field 15 Haly Polder, Pln. Blairmont, was situated on a highly acidic clay overlying a markedly acidic heavy silt subsoil. The organic matter content of the area is above the average and the carbon:nitrogen ratio is wide. The lime requirement is high and above the average. The salinity of the topsoil is above, that of the subsoil below the average.

The distribution of the rainfall was unsatisfactory, there being an excess of 23.46 in. above the normal in December 1933 and a period of five months (February to June 1934) when the rainfall was constantly below the average.

The trial in Field 51 Melville, Pln. Cane Grove, was situated on a highly acidic pegassy clay with organic matter content above the average and a wide carbon : nitrogen ratio. The theoretical lime requirement of the area is much above the average, but the soil and subsoil are of normal salinity.

Of the thirteen months of growth, ten were drier than might have been expected, and the total rainfall for the period was 25.22 in. below the normal.

The results from the individual experiments and from the three combined are given in Table XLIX.

It will be seen that the results are not uniform. At Rose Hall there is no significant effect from the treatments. There appears to be some effect on the yield of cane but fluctuations in plot yields were so great that these differences are not definite. At Blairmont there was no effect on the yield of cane but a significant and favourable effect on the sucrose content of the cane, the juice purity and the glucose ratio. At Cane Grove there was a marked and definite effect on the yield of cane, Preciphos, basic slag and superphosphate giving significantly higher yields than the control but not differing in effect among themselves. Nicifos, on the other hand, is definitely superior to all the other treatments. Here there was no effect on the quality of the cane.

TABLE XLIX.

Comparative Effect of Various Phosphatic Fertilisers (Plant Canes).

Treatments.	Cane.		Sucrose.		Purity.		Glucose Ratio.	
	Tons per acre.	Sig. Dif. 20 : 1	% Cane.	Sig. Dif. 20 : 1		Sig. Dif. 20 : 1		Sig. Dif. 20 : 1
	Pln. Rose Hall, Field 19				*L. 20.*			
Control	35.73		13.79		87.5		6.43	
Preciphos	41.92		14.17		88.6		5.93	
Basic Slag	40.02	—	13.95	—	87.8	—	7.62	—
Superphosphate	37.30		13.99		87.9		7.35	
Nicifos	41.09		13.68		87.6		8.35	
No Phosphate	35.73	—	13.79	—	87.5	—	6.43	—
Phosphate	40.08		13.95		88.0		7.31	
	Pln. Blairmont, Field 15 Haly Polder.							
Control	61.60		11.32		80.0		11.80	
Preciphos	59.20		12.11		83.1		8.71	
Basic Slag	61.12	—	12.26	—	83.0	—	8.84	—
Superphosphate	59.40		12.57		84.9		7.25	
Nicifos	59.93		12.27		83.2		9.01	
No Phosphate	61.60	—	11.32	0.98	80.0	3.47	11.80	2.99
Phosphate	59.91		12.30		83.6		8.45	
	Pln. Cane Grove, Field 51 Melville.							
Control	22.91		14.29		86.4		10.06	
Preciphos	26.05		14.13		87.1		9.05	
Basic Slag	26.36	1.76	14.83	—	87.5	—	8.87	—
Superphosphate	27.11		14.75		87.8		8.99	
Nicifos	33.28		14.89		86.9		9.16	
No Phosphate	22.91	1.39	14.29	—	86.4	—	10.06	—
Phosphate	28.20		14.65		87.3		9.02	
	Combination of Three Trials.							
Control	40.08		13.13		84.6		9.43	
Preciphos	42.39		13.47		86.3		7.90	
Basic Slag	42.50	—	13.68	—	86.1	—	8.44	—
Superphosphate	41.27		13.77		86.9		7.87	
Nicifos	44.77		13.61		85.9		8.84	
No Phosphate	40.08	2.31	13.13	0.45	84.6	1.35	9.43	—
Phosphate	42.73		13.63		86.3		8.26	

(C4—C6) Comparison of the Effect of Graded Doses of Superphoshate and Different Methods of Application (Plant Canes).

The Treatments used in these tests were:—

2 cwt. per acre superphosphate applied to plant canes and to subsequent ratoons.
4 cwt. „ „ „ „ „ „ „ „ „ „ „
3 cwt. „ „ „ „ „ „ canes only.
6 cwt. „ „ „ „ „ „ „ „
Control.

The experiment in Field 13 Resource, Pln. Port Mourant, was located on a markedly acidic clay overlying a similar subsoil. The organic matter content and the carbon:nitrogen ratio of the site are normal. The lime requirement is, however, high, and salinity is above the average.

The rainfall was below the normal from the second to the sixth month of growth and during four other months at later periods, ending up with a total deficit from the average of 26.60 in.

The experiment in Field 20 Tappinsburg, Pln. Rose Hall, was situated on markedly acidic clay whose organic matter content is below the average in the topsoil and above it in the subsoil. The carbon:nitrogen ratio is normal, but the theoretical lime requirement is much above the average. Salinity is normal in the topsoil but below the average in the subsoil.

Distribution of the rainfall was abnormal, there being two months with marked excesses and five with marked deficits from the normal.

The experiments in Field 53 Melville, Pln. Cane Grove, was located on highly acidic pegassy clay overlying a similar subsoil. In both the organic matter content is above the average and the carbon:nitrogen ratio wide. The theoretical lime requirement is high but salinity is low in both topsoil and subsoil.

Rainfall was subnormal for most of the growth period, the total precipitation being 25.22 in. below the average.

The results from the individual experiments and from the three combined are given in Table L.

Here again the results are uneven. As in the group of trials just discussed, there is a definite effect on cane yield on the pegassy clay of the Melville section at Pln. Cane Grove, but nowhere else has the yield been definitely affected and in none of the three trials have the treatments had any effect on the quality of the cane.

TABLE L.

Comparative Effect of Graded Dressings of Superphospate (Plant Canes).

Treatments.	Cane, Tons per acre.	Cane, Sig. Dif. 20 : 1	Sucrose, % Cane.	Sucrose, Sig. Dif. 20 : 1	Purity.	Purity. Sig. Dif. 20 : 1	Glucose Ratio.	Glucose Ratio. Sig. Dif. 20 : 1
	Pln. Port		*Mourant,*		*13 R.*			
Control	49.75		13.20		85.0		9.56	
2 cwt. Superphosphate	53.96		13.46		85.3		7.60	
3 cwt. ,,	50.18	—	13.55	—	86.5	—	7.90	—
4 cwt. ,,	48.73		13.13		85.7		8.88	
6 cwt. ,,	49.37		13.77		85.6		7.40	
No Phosphate	49.75		13.20		85.0		9.56	
Phosphate	50.56	—	13.48	—	85.9	—	7.95	—
	Pln. Rose		*Hall,*	*20 T.*				
Control	48.39		12.08		83.5		10.53	
2 cwt. Superphosphate	47.08		11.61		82.1		11.91	
3 cwt. ,,	50.23	—	11.50	—	82.0	—	12.41	—
4 cwt. ,,	49.88		11.76		83.2		11.02	
6 cwt. ,,	50.17		11.88		82.8		11.14	
No Phosphate	48.39		12.08		83.5		10.53	
Phosphate	49.34	—	11.69	—	82.5	—	11.62	—
	Pln. Cane		*Grove,*	*53 M.*				
Control	20.66		15.17		87.4		10.48	
2 cwt. Superphosphate	25.44		15.35		87.9		8.80	
3 cwt. ,,	28.23	4.34	14.95	—	87.0	—	10.65	—
4 cwt. ,,	26.26		15.19		88.8		8.56	
6 cwt. ,,	27.62		15.15		88.4		8.44	
No Phosphate	20.66	3.42	15.17	—	87.4	—	10.48	
Phosphate	26.89		15.16		88.0		9.11	—
	Combination of Three Trials.							
Control	39.60		13.48		85.3		10.19	
2 cwt. Superphosphate	42.16		13.48		85.3		9.44	
3 cwt. ,,	42.88	—	13.33	—	85.2	—	10.32	—
4 cwt. ,,	41.62		13.36		85.9		9.49	
6 cwt. ,,	42.39		13.60		85.6		8.99	
No Phosphate	39.60		13.48		85.3		10.19	
Phosphate	42.26	—	13.44	—	85.5	—	9.56	—

SUMMARY.

The experiments recorded in this Bulletin have taken the solution of the manurial problems a step further and it is now possible to give definite advice on certain points. On the other hand much remains to be done, and along other lines no conclusions at all or only tentative ones can be drawn. The present position is briefly stated below.

Sulphate of Ammonia.

For *plant canes of D. 625 on flood-fallowed frontland soil* a dressing of 2 cwt. per acre is advised.

For *first ratoons of D. 625 on flood-fallowed frontland soil*, an application of 4 cwt. per acre is advised

For *second ratoons of D. 625 on flood-fallowed frontland soil*, there are not yet sufficient data available to make a definite recommendation. There are, however, indications that 4 cwt. per acre may prove to be the optimum dose.

Little information is available, as to the nitrogen requirements of any other variety on flood-fallowed frontland soil. The matter is being investigated. However, preliminary work indicates that the varieties P.O.J. 2878 and Diamond 10 can, perhaps, profitably utilise heavier doses than the standard cane, D. 625.

The *nitrogen requirements of cane on unflooded frontland soil* have not been as thoroughly investigated as the requirements on flooded soil for but little frontland soil is now planted without previous flood-fallowing. The indications are that for plant canes 3 cwt. per acre of sulphate of ammonia is generally desirable, though from one experiment with Diamond 10 it appears that this cane is capable of utilising heavier dressings. For *first ratoons*, 3.5 cwt. per acre appears to be suitable, while for *second ratoon* crops it is probable, that 1.75 to 2 cwt. may prove more economic.

For *plant canes of D. 625 on pegassy clay soil*, a dressing of 6 cwt. per acre is recommended.

For *first ratoons of D. 625 on pegassy clay soil*, an application of 6 cwt. per acre is advised.

For *second ratoons of D. 625 on pegassy clay soil*, no definite recommendation can, as yet, be made.

Nothing definite is known as to the nitrogen requirements of varieties other than D. 625 on pegassy clay soil. P.O.J. 2878 and Diamond 10 are, however, likely to use profitably as much or possibly more nitrogen than D. 625.

The possibility of there being a residual effect from heavy applications of sulphate of ammonia has been investigated. No statistically significant effect has been found.

Experiments to test the point have indicated that there is nothing to be gained by splitting the heavier doses of sulphate of ammonia into two applications.

Organic Nitrogenous Manures.

Five proprietary products, two derived from fish refuse, two from leather refuse and one from peat, have been tested. None appears to be as satisfactory for cane under local conditions as sulphate of ammonia.

Lime-bearing Materials.

No further information is as yet available regarding the effects of lime-bearing materials on *flooded frontland soils.* Five more trials bearing on this question will be reaped in the Autumn of 1935. Pending further data, it is advised that small applications of half or one ton per acre should prove useful as a form of insurance against the tendency towards increased acidity which these soils possess.

Lime-bearing materials appear to improve the yield on *unflooded frontland soils* but it is doubtful if it would be profitable to attempt to secure increased yields in this manner. Still, as a form of insurance against increasing soil acidity, small applications seem to be indicated.

On *pegassy clay soils* the application of lime-bearing materials produces slight but definite increases in yield. In view of this, of increasing soil acidity, and of the recommendations above that the dose of sulphate of ammonia now used be trebled, it is recommended that one ton per acre of lime or limestone be given at planting.

No differences have been obtained between the effects of lime and of equal quantities of ground limestone.

Phosphatic Manures.

Conclusive experimental results are not yet sufficient to enable a pronouncement to be made. A number of trials are in progress and others are projected.

Potassic Manures.

With a heavy programme of experiments in progress on the three locally more urgent problems of nitrogen, phosphate and calcium requirements, it was found impossible to start any new potash trials. As already stated, one experiment on *unflooded frontland soil* indicated that heavy applications of sulphate of potash at planting had no immediate or residual effect on the yield of sucrose. One experiment on *pegassy clay soil* indicated that applications of 2 cwt. per acre of sulphate of potash resulted in definite yield increases. As to whether such increases are economic or not will depend on the relative prices of sugar and sulphate of potash.

FLOOD-FALLOWING TRIALS.

INTRODUCTION.

The cane-growing area of British Guiana is below sea level and has to be protected from the sea, on the one hand, and from inland water (the result of rain in the savannahs and highlands), on the other. The estates are laid out in fields, usually of from ten to twenty acres each, which are, themselves, sub-divided into beds by open drains generally spaced every 37 feet. The spreading of the soil from these drains towards the centre of the beds and the general method of cultivation tend to give the beds the desired camber for running off excess water. Between the fields is an elaborate system of canals, some serving for transport and irrigation, others to take off drainage water. The earth removed in the making of these canals is piled on the external beds surrounding the adjacent fields. In consequence, these 'dam beds,' as they are called, are normally higher than the remainder of the fields.

Elsewhere, when it is believed that cane soils need a rest or a change of crop, it is usual to employ a rotation (cotton, rice, root-crops, etc.), sow a cover-crop, or just throw the land out of cultivation for a time. In British Guiana, crop rotation is not practised on sugar estates and the use of cover crops has made but little progress. The abandoning of the land to a natural growth of weed and bush has rapidly given way in recent years, especially on the acid clays and silts (frontland soils) which represent about 75 per cent. of the cane area, to the practice of flood-fallowing.

Flood-fallowing consists of flooding the field over (to a depth of 6 to 12 inches over the highest points of the cambered beds) immediately after harvest of the last ratoons of the cycle (now usually second or third ratoons) and maintaining the water level for a period of four months to two years. The level nature of the cane area, the stiff, almost impermeable clays, a high rainfall and the presence of large navigation-irrigation canals around each field tend to facilitate the operation. A dike of compacted soil, locally called a 'smouse', about one foot high and three wide, is built along the high dam (external) beds surrounding the field, water is run in from the navigation trench as high as gravity can take it, the cut to the navigation is closed and pumps (6,000 gallons per minute) mounted in scows, or punts, are used to complete the operation.

The practice is empirical and is said to have originated in the attempt to combat the giant moth borer (*Castnia licus*) by flooding the land over for a few days. Planters soon found that when the period of flooding was extended, the

ultimate result was a much heavier yield of cane (particularly in the plant canes) than would have been obtained if the land were replanted immediately or replanted after a grass-fallow period.

The mechanism underlying the phenomenon of increased yields has not yet been fully explained and opinion differs somewhat as to how the increase in yield may be affected by :

(*a*) Extending the duration of flooding;

(*b*) Increasing or reducing the depth of water;

(*c*) Having a clean fallow or encouraging a growth of

(1) floating vegetation on a relatively high water level, or (2) semi-aquatic vegetation by lowering the water level somewhat ;

(*d*) Adding molasses to the flood water ;

(*e*) Liming before or after flooding.

A discussion of the effect of flood-fallowing on heavy frontland soils (the flood-fallowing of pegasse soil is not widely practiced, and its effect on yield in such areas not yet clearly demonstrated), will be found in the *Divisional Reports* of the Chemical Division, Department of Agriculture, B.G., for the years 1931 to 1934 and in *Tropical Agriculture*, X, No 4, pp. 91–95. Laboratory and field tests show that the practice increases the ammonia content of the soil to an amount equivalent to a dressing of about 2 cwt. per acre of sulphate of ammonia. Flooded soils show a considerable improvement in texture and are more friable than unflooded ; their 'rate of solution' is higher and there is a considerable increase in available iron.

In an attempt to throw further light on the subject, two experiments were established at Pln. Port Mourant and two at Pln. Lusignan. The two latter were so severely damaged by the floods of December—January, 1933—34, that no conclusions can be drawn from them. One field averaged 9.01 tons cane per acre and the other 16.90 tons, whereas a normal yield would have beeen about 40 tons.

Situated in the front, low-lying section of the estate, these trials were completely covered with water for some time and, apart from the low cane yield, there must also have been considerable intermingling and changing of the water over the various plots. In consequence, only the two trials at Port Mourant will be considered here.

The Port Mourant experiments will be reaped again as first and second ratoons. The Lusignan experiments will be restarted.

RESULTS.

Flood-Fallowing Experiment in Field 28 Tain Windward, Port Mourant.

Details of the treatments, layout, calendar of operations, etc., are as follows :—

Treatments :—

(*a*) Flooded to a minimum depth of 12 in. for 6 months ;

(*b*) „ „ „ „ „ „ „ „ „ „ „ „ with 5 tons molasses per acre added to flood water ;

(*c*) „ „ „ „ „ „ „ „ „ „ „ „ and sown with floating vegetation ;

(*d*) Partially flooded (depth of 3 in.) for 6 months and semi-aquatic weeds allowed to grow spontaneously.

Layout : 4 x 4 Latin Square.

Variety : D. 625.

Planted : 30. VI. 1933.

Reaped : 4. IX. 1934.

The vegetable matter was eventually incorporated with the soil.

The results from the plant canes are presented in Table LI.

TABLE LI.

Comparison of Various Types of Flood-fallow.

Type of Flooding for 6 months.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
12 inches plus 5 tons molasses:	40.62	13.45	7.50	86.9	5.46	112.81
3 inches plus rooted weeds:	35.16	13.21	6.00	86.8	4.64	95.87
12 inches plus floating weeds:	34.84	13.25	7.64	85.5	4.62	95.45
12 inches:	34.37	13.43	5.47	87.6	4.62	95.45
Mean:	36.25	13.34	6.65	86.7	4.84	100.00
Standard Error:	...	...	0.33	...	...	...
Significant Difference, 20: 1:	...	...	1.14	...	...	...

Treatments have had a statistically significant effect on glucose ratio only. The effect of a deep flooding with the addition of molasses or with the addition of floating weeds was to retard maturity as compared with a plain deep flooding or a shallow flooding with semi-aquatic weeds.

There was a marked, but statistically insignificant increase in yield of sucrose per acre due to the addition of molasses to the flood water. The yields from the other treatments were practically identical. It is unfortunate that satisfactory data are not available from the corresponding experiment at Lusignan as it was intended to combine the two latin squares statistically. In the circumstances all that can be said is that this trial *indicated* that:

(*a*) The addition of five tons per acre of molasses to the flood water may give an increased yield which will pay for the molasses in the plant cane crop ;

(*b*) The depth of water and the presence or absence of vegetation, wholly or semi-aquatic, are of minor importance.

Flood Fallowing Experiment in Field 28 Tain Leeward, Port Mourant.

Details of the treatments, layout, calendar of operations, etc., are as follows:—

Treatments :—

(*a*) Grass-fallowed for 12 months ;

(*b*) „ „ „ 8 „ , flood-fallowed for 4 months ;

(*c*) „ „ „ 6 „ „ „ „ 6 „ :

(*d*) Not grass-fallowed, „ „ „ 12 „ :

Layout : 4 x 4 latin square, each plot of each treatment being sub-divided into a sub-plot receiving pulverised limestone at the rate of one ton per acre just before flooding (at the beginning of the grass-fallow in the case of plots never flooded at all), and a sub-plot receiving the limestone application after flooding and immediately before planting.

Variety : D. 625.

Planted : 28.I.1934

Reaped : 27.III.1935.

The results from the fourteen-months old plant canes are detailed in Table LII and illustrated in Figure XLI.

TABLE LII.

Comparison of Various Durations of Flooding.

Treatments.		Grass-fallowed 12 months.	Grass-fallowed 8 months, Flood-fallowed 4 months.	Grass-fallowed 6 months, Flood-fallowed 6 months.	Not Grass-fallowed, Flood-fallowed, 12 months.	Means.	S.E. of Difference of two means.	Significant Difference 20 : 1.
1 Ton limestone per acre before flooding	Tons Sucrose / acre :	4.15*	5.09	5.72	6.29	5.315	0.40	0.92
	Per Cent.:	76.51	93.84	105.46	115.97	97.99	7.37	16.96
1 Ton limestone per acre after flooding	Tons Sucrose / acre :	5.24*	4.93	5.60	6.36	5.533	0.40	0.92
	Per Cent.:	96.61	90.89	103.25	117.26	102.01	7.37	16.96
Mean	Tons Sucrose per acre :	4.70	5.01	5.66	6.32	5.424	0.15	0.38
	Per Cent.:	86.65	92.37	104.35	116.52	100.00	2.77	7.01
S.E. of Diff.	Tons Sucrose per acre :	0.40	...	...	...	...	...	...
	Per Cent.:	7.37	...	...	...	...	...	...
Sig. Diff. 20 : 1.	Tons Sucrose per acre :	0.92	...	...	...	...	...	...
	Per Cent.:	16.96	...	...	...	...	...	...

*In the case of plots not flood-fallowed at all, the limestone was applied at the beginning and at the end of the grass-fallow period.

The treatments have had a significant effect upon the yield of cane but no significant effect upon its sucrose content, the juice purity or the glucose ratio. In consequence, the yield of cane has, in each case, been multiplied by the general mean sucrose content of the cane for the whole experiment to obtain the yields of sucrose per acre given in Table LII. The trial averaged 39.68 tons cane per acre, and the general average analytical figures were :—

Percentage of sucrose in cane	...	...	...	13.67
Purity	...	...	...	87.04
Glucose Ratio	...	...	...	6.51

These data are considerably better than the average for plant canes of D. 625.

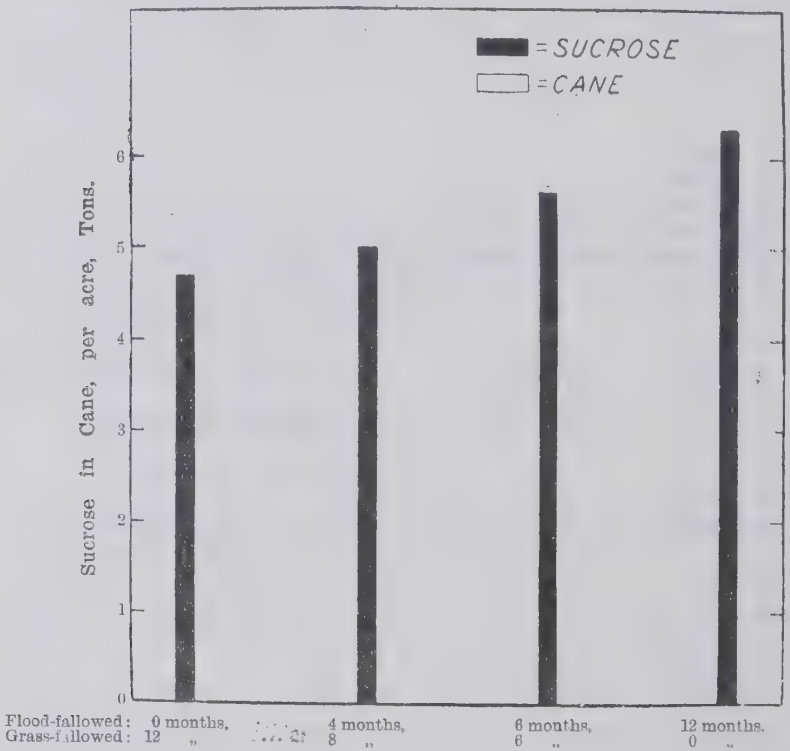

FIG. XLI.

Effect of Duration of Flood-fallow (Frontland Soil, Plant Canes).

Table LIII presents a comparison of the major issues involved in the trial.

TABLE LIII.

Effect of Flood-fallowing or not with Limestone before or after Flooding.

Treatments.	No Flooding.		Flooding.		Significant Difference 20 : 1.	
	Sucrose in Cane per Acre, Tons.	Per Cent.*	Sucrose in Cane per Acre, Tons.	Per Cent.*	Sucrose in Cane per Acre, Tons.	Per Cent.*
Limestone Before	4.15	76.51	5.70	105.09	0.746	13.75
,, After	5.24	96.61	5.63	103.80	—	—
Significant Difference, 20 : 1 :	0.916	16.89	—	—		

* Calculated on the general mean for the experiment, 5.424 tons sucrose in cane per acre.

The difference between the mean yields of all the 24 flooded and all the 8 unflooded plots was 0.97 tons sucrose in cane, and is statistically significant.

Conclusions :—Under the conditions of this experiment :—

(*a*) Flood-fallowing does not affect the sucrose content of the cane, the juice purity or the glucose ratio, nor does the time of application of 1 ton limestone per acre, (*i.e.*, before flood or grass-fallow, or just before planting) affect these factors.

(*b*) Flood-fallowing has a definite and beneficial effect upon the yield of cane. This effect appears to be enhanced as the duration of the flooding is prolonged, at least up to 12 months. All of the increments are not statistically significant over the yields from the preceding treatment, but this is attributed to the fact that only a small number of replicates were available. It had been hoped, of course, to combine statistically these results with those from the corresponding trial at Lusignan which have had to be discarded.

(*c*) There is no difference in the yield from flood-fallowed plots limed before flooding or just before planting.

(*d*) Grass-fallowed plots limed just before planting outyielded similar plots limed at the commencement of the grass-fallow.

SUMMARY.

Pending the accumulation of further information, and bearing in mind the fact that only one trial of each kind has been reaped, and in plant canes only, the situation may be tentatively summarised as follows :

Flood-fallowing is more advantageous than grass-fallowing on frontland soils;

The depth of water and the presence or absence of vegetation, rooted or floating, are not major factors ;

The addition of five tons of molasses per acre to the flood water may give in the plant canes an increased yield sufficient to pay for the molasses ;

A six-month flood-fallow gives about 12 per cent. increase over a four-month ;

A twelve-month flood-fallow gives about 12 per cent. increase over a six-month.

APPENDIX I.—RAINFALL DATA.

Rainfall at Sophia Experiment Station.

Month.	Rainfall 1933-1935, inches.	Average Rainfall 1921-1934, inches.	Excess or Deficit During Growth of the Various Experiments.							
			Fields 13 East, A.B.C.D. and 16 East, A.B.C.D.	Fields 11 East, A.B.C.D. and 12 East, A.B.	Fields 1 & 5 East and 1 & 2 West.	Field 6 East.	Field 10 West.	Fields 11 & 16 West.	Field 13 West.	Field 6 West, A,B.
June 1933	12.39	14.13	−1.74							
July ..	9.06	10.66	−1.60	−1.60						
August ..	13.43	8.29	+5.14	+5.14						
September ..	1.12	2.63	−1.51	−1.51	−1.51					
October ..	3.41	3.94	−0.53	−0.53	−0.53	−0.53	−0.53			
November	10.25	6.00	+4.25	+4.25	+4.25	+4.25	+4.25			
December .	28.09	14.81	+13.28	+13.28	+13.28	+13.28	+13.28			
January 1934	29.71	8.89	+20.82	+20.82	+20.82	+20.82	+20.82			
February ..	1.31	3.46	−2.15	−2.15	−2.15	−2.15	−2.15			
March ..	3.42	4.03	−0.61	−0.61	−0.61	−0.61	−0.61	−0.61		
April ..	2.23	4.87	−2.64	−2.64	−2.64	−2.64	−2.64	−2.64	−2.64	
May ..	3.42	11.40	−7.98	−7.98	−7.98	−7.98	−7.98	−7.98	−7.98	−7.98
June ..	9.35	14.13	−4.78	−4.78	−4.78	−4.78	−4.78	−4.78	−4.78	−4.78
July ..	10.56	10.66	−0.10	−0.10	−0.10	−0.10	−0.10	−0.10	−0.10	−0.10
August ..	3.86	8.29	−4.43	−4.43	−4.43	−4.43	−4.43	−4.43	−4.43	−4.43
September ..	1.50	2.63	−1.13	−1.13	−1.13	−1.13	−1.13	−1.13	−1.13	−1.13
October ..	4.78	3.94	+14.29	+16.03	+12.49	+14.00	+0.84	+0.84	+0.84	+0.84
November ..	4.98	6.00					−1.02	−1.02	−1.02	−1.02
December ..	6.04	14.81					+13.82	−8.77	−8.77	−8.77
January 1935	5.91	8.89						−2.98	−2.98	−2.98
February ..	11.15	3.46						+7.69	+7.69	+7.69
March ..	3.80	4.03						−0.23	−0.23	−0.23
April ..	1.46	4.87						−26.14	−25.55	−3.41
										−26.30

RAINFALL AT PLANTATION PORT MOURANT.

Month.	Rainfall 1933—1935, Inches.	Average Rainfall 1911—1934, Inches.	Excess or Deficit during Growth of the Various Experiments. Field 28 T.W.	Field 8 A.	Field 13 R.	Field 28 T.L.	Field 4 H.E.	Fields 28 A.E. & 14 A.O.L.	Field 15 A.O.L.
July 1933	7.49	8.89	− 1.40						
August	11.04	5.01	+ 6.03						
September	3.29	2.03	+ 1.26						
October	1.66	2.52	− 0.86	− 0.86					
November	9.09	3.54	+ 5.55	+ 5.55					
December	29.50	8.81	+20.69	+20.69					
January 1934	7.19	6.92	+ 0.27	+ 0.27	+ 0.27				
February	1.42	4.52	− 3.10	− 3.10	− 3.10	− 3.10			
March	3.04	3.59	− 0.55	− 0.55	− 0.55	− 0.55	− 0.55		
April	1.41	4.64	− 3.23	− 3.23	− 3.23	− 3.23	− 3.23	− 3.23	
May	2.90	8.65	− 5.75	− 5.75	− 5.75	− 5.75	− 5.75	− 5.75	− 5.75
June	4.82	9.33	− 4.51	− 4.51	− 4.51	− 4.51	− 4.51	− 4.51	− 4.51
July	11.63	8.89	+ 2.74	+ 2.74	+ 2.74	+ 2.74	+ 2.74	+ 2.74	+ 2.74
August	3.07	5.01	− 1.94	− 1.94	− 1.94	− 1.94	− 1.94	− 1.94	− 1.94
September	1.01	2.03	+15.20	− 1.02	− 1.02	− 1.02	− 1.02	− 1.02	− 1.02
October	3.33	2.52		+ 8.29	+ 0.81	+ 0.81	+ 0.81	+ 0.81	+ 0.81
November	4.18	3.54			+ 0.64	+ 0.64	+ 0.64	+ 0.64	+ 0.64
December	5.78	8.81			− 3.03	− 3.03	− 3.03	− 3.03	− 3.03
January 1935	3.45	6.92			− 3.47	− 3.47	− 3.47	− 3.47	− 3.47
February	11.16	4.52			+ 6.64	+ 6.64	+ 6.64	+ 6.64	+ 6.64
March	1.36	3.59			−26.60	− 2.23	− 2.23	− 2.23	− 2.23
April	1.08	4.64				−18.00	−14.90	−14.35	− 3.56
									−14.68

RAINFALL AT PLANTATION ROSE HALL.

Month.	Rainfall 1933—1935, Inches.	Average Rainfall 1916—1934, Inches.	Excess or Deficit during Growth of the various Experiments. Field 19 L. 20	Field 30 R.H.	Field 20 T.
November 1933	9.82	3.75	+ 6.07		
December	27.68	10.79	+16.89		
January 1934	9.03	8.27	+ 0.76		
February	0.48	4.85	− 4.37		
March	2.93	5.24	− 2.31	− 2.31	
April	2.96	5.03	− 2.07	− 2.07	− 2.07
May	3.19	9.70	− 6.51	− 6.51	− 6.51
June	6.09	10.94	− 4.85	− 4.85	− 4.85
July	19.91	10.79	+ 9.12	+ 9.12	+ 9.12
August	3.50	6.28	− 2.78	− 2.78	− 2.78
September	3.50	2.63	+ 0.87	+ 0.87	+ 0.87
October	3.80	2.78	+ 1.02	+ 1.02	+ 1.02
November	2.87	3.75	+ 11.84	− 0.88	− 0.88
December	5.13	10.79		− 5.66	− 5.66
January 1935	3.83	8.27		− 4.44	− 4.44
February	14.42	4.85		+ 9.57	+ 9.57
March	1.17	5.24		− 8.92	− 4.07
					− 10.68

RAINFALL AT PLANTATION BLAIRMONT.

Month.	Rainfall 1933—1934, Inches.	Average Rainfall 1911—1934, Inches.	Excess or Deficit during Growth of the various Experiments.		
			Field 15 H.	Field 18 R.	Field 4 H.
September 1933	0.97	2.18	− 1.21		
October	2.87	2.63	+ 0.24	+ 0.24	
November	7.49	3.68	+ 3.81	+ 3.81	+ 3.81
December	33.89	10.43	+23.46	+23.46	+23.46
January 1934	12.47	8.96	+ 3.51	+ 3.51	+ 3.51
February	1.72	4.76	− 3.04	− 3.04	− 3.04
March	2.55	4.56	− 2.01	− 2.01	− 2.01
April	3.26	5.62	− 2.36	− 2.36	− 2.36
May	3.70	10.40	− 6.70	− 6.70	− 6.70
June	5.57	12.17	− 6.60	− 6.60	− 6.60
July	13.41	10.32	+ 3.09	+ 3.09	+ 3.09
August	4.65	6.56	− 1.91	− 1.91	− 1.91
September	2.28	2.18	+ 0.10	+ 0.10	+ 0.10
October	5.06	2.63	+ 2.43	+11.59	+ 2.43
			+12.81		+13.78

RAINFALL AT PLANTATION CANE GROVE.

Month.	Rainfall 1934-1935, Inches.	Average Rainfall 1916-1934, Inches.	Excess or Deficit during Growth of the Various Experiments.	
			Field 63 M.	Fields 51 M. & 53 M.
April 1934	4.54	5.74	− 1.20	
May	2.88	11.27	− 8.39	− 8.39
June	7.95	11.35	− 3.40	− 3.40
July	10.18	9.99	+ 0.19	+ 0.19
August	2.73	6.86	− 4.13	− 4.13
September	0.68	2.11	− 1.43	− 1.43
October	6.37	3.47	+ 2.90	+ 2.90
November	4.42	5.55	− 1.13	− 1.13
December	4.23	11.82	− 7.59	− 7.59
January 1935	6.83	7.86	− 1.03	− 1.03
February	8.62	3.71	+ 4.91	+ 4.91
March	2.77	3.72	− 0.95	− 0.95
April	1.63	5.74	− 4.11	− 4.11
May	10.21	11.27	−25.36	− 1.06
				−25.22

RAINFALL AT PLANTATION ENMORE.

Month.		Rainfall 1934—1935, Inches.	Average Rainfall 1913—1934, Inches.	Excess or Deficit during Growth of the Experiment. Field 8 B.A.
March	1934	4.75	4.04	+ 0.71
April		3.95	5.42	— 1.47
May		3.38	10.99	— 7.61
June		7.99	11.64	— 3.65
July		12.16	9.10	+ 3.06
August		3.63	6.28	— 2.65
September		0.81	2.23	— 1.42
October		4.83	3.01	+ 1.82
November		3.81	5.95	— 2.14
December		6.26	11.39	— 5.13
January	1935	3.03	8.49	— 5.46
February		9.22	3.93	+ 5.29
				—18.65

RAINFALL AT PLANTATION LUSIGNAN.

Month.		Rainfall 1933—1935, Inches.	Average Rainfall 1917—1934, Inches.	Excess or Deficit during Growth of the Various Experiments. Field H.	Field 38 A.	Field 28E.G.H.	Field 4 E.	Field F.
September	1933	1.35	2.13	— 0.78				
October		1.56	3.28	— 1.72				
November		18.57	5.70	+12.87				
December		26.32	11.83	+14.49				
January	1934	28.99	9.64	+19.35				
February		1.88	3.89	— 2.01	— 2.01			
March		3.50	3.95	— 0.45	— 0.45	— 0.45	— 0.45	— 0.45
April		3.82	5.28	— 1.46	— 1.46	— 1.46	— 1.46	— 1.46
May		2.89	11.23	— 8.34	— 8.34	— 8.34	— 8.34	— 8.34
June		9.68	12.96	— 3.28	— 3.28	— 3.28	— 3.28	— 3.28
July		13.45	9.68	+ 3.77	+ 3.77	+ 3.77	+ 3.77	+ 3.77
August		4.86	6.40	— 1.54	— 1.54	— 1.54	— 1.54	— 1.54
September		0.93	2.13	— 1.20	— 1.20	— 1.20	— 1.20	— 1.20
October		7.12	3.28	+29.70	+ 3.84	+ 3.84	+ 3.84	+ 3.84
November		4.34	5.70		— 1.36	— 1.36	— 1.36	— 1.36
December		6.62	11.83		— 5.21	— 5.21	— 5.21	— 5.21
January	1935	4.11	9.64		— 5.53	— 5.53	— 5.53	— 5.53
February		7.55	3.89		—22.77	—20.76	+ 3.66	+ 3.66
March		3.40	3.95				—17.10	— 0.55
April		1.56	5.28					— 3.72
								—21.37

RAINFALL AT PLANTATION LA BONNE INTENTION.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1916—1934, Inches.	Excess or Deficit during Growth of the Experiment. Field 22 C.M.
September	1933	0.87	2.28	— 1.41
October		2.07	3.25	— 1.18
November		13.65	6.82	+ 6.83
December		23.36	12.34	+11.02
January	1934	29.82	9.03	+20.79
February		1.75	3.77	— 2.02
March		3.83	4.44	— 0.61
April		2.73	5.05	— 2.32
May		2.52	11.10	— 8.58
June		9.13	12.26	— 3.13
July		9.47	9.73	— 0.26
August		4.11	7.23	— 3.12
September		1.25	2.28	— 1.03
October		4.37	3.25	+ 1.12
				+16.10

RAINFALL AT PLANTATION OGLE.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1906—1934, Inches.	Excess or Deficit during Growth of the Experiment. Field 61 O.
October	1933	4.53	3.37	+ 1.16
November		13.46	5.23	+ 8.23
December		27.77	10.80	+16.97
January	1934	31.28	7.96	+ 23.32
February		1.71	4.37	— 2.66
March		4.29	5.28	— 0.99
April		3.12	5.61	— 2.49
May		2.95	11.15	— 8.20
June		8.97	10.90	— 1.93
July		10.44	9.71	+ 0.73
August		5.36	7.05	— 1.69
September		2.09	2.26	— 0.17
				+32.28

RAINFALL AT PLANTATION DIAMOND.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1890—1934, Inches.	Excess of Deficit during Growth of the various Experiments.	
				Field 90 G.D.	Field 89 G.D.
October	1933	9.19	4.04	+ 5.15	
November		14.72	6.04	+ 8.68	+ 8.68
December		23.90	12.26	+11.64	+11.64
January	1934	28.55	9.75	+18.80	+18.80
February		2.08	5.92	− 3.84	− 3.84
March		3.67	7.58	− 3.91	− 3.91
April		1.69	7.29	− 5.60	− 5.60
May		2.98	12.76	− 9.78	− 9.78
June		8.80	13.89	− 5.09	− 5.09
July		13.05	11.27	+ 1.78	+ 1.78
August		8.09	7.97	+ 0.12	+ 0.12
September		2.77	3.72	− 0.95	− 0.95
October		12.31	4.04	+17.00	+ 8.27
					+20.12

RAINFALL AT PLANTATION WALES.

Month.		Rainfall 1934—1935, Inches.	Average Rainfall 1906—1934, Inches.	Excess or Deficit during Growth of the various Experiments.
				Fields 9C. & 4 B.
March	1934	3.96	6.97	− 3.01
April		1.64	6.87	− 5.23
May		2.16	13.84	−11.68
June		10.56	14.13	− 3.57
July		12.17	11.63	+ 0.54
August		7.47	8.31	− 0.84
September		3.65	3.70	− 0.05
October		12.02	4.29	+ 7.73
November		6.12	6.44	− 0.32
December		7.38	12.84	− 5.46
January	1935	4.19	9.64	− 5.45
February		11.06	5.17	+ 5.89
March		4.43	6.97	− 2.54
				−23.99

RAINFALL AT PLANTATION VERSAILLES.

Month.		Rainfall 1934—1935, Inches.	Average Rainfall 1916—1934, Inches.	Excess or Deficit during Growth of the Experiment. Field 31 R.D.Z.
March	1934	3.34	4.65	— 1.31
April		2.08	4.79	— 2.71
May		2.52	10.94	— 8.42
June		7.99	12.98	— 4.99
July		9.48	10.16	— 0.68
August		8.83	8.24	+ 0.59
September		3.00	3.10	— 0.10
October		7.57	3.12	+ 4.45
November		3.67	6.07	— 2.40
December		4.68	12.46	— 7.78
January	1935	5.46	8.73	— 3.27
February		10.14	3.49	+ 6.65
				—19.97

RAINFALL AT PLANTATION UITVLUGT.

Month.		Rainfall 1933--1935, Inches.	Average Rainfall 1916--1934, Inches.	Excess or Deficit during Growth of the Various Experiments. Field 75 Z.	Field 13 E.	Field 94 M.Z.	Field 14 Z.
September	1933	1.44	3.34	— 1.90			
October		10.62	4.61	+ 6.01			
November		14.60	7.62	+ 6.98	+ 6.98		
December		23.32	13.84	+ 9.48	+ 9.48	+ 9.48	
January	1934	34.50	10.11	+24.39	+24.39	+24.39	
February		2.36	4.12	— 1.76	— 1.76	— 1.76	
March		3.30	4.72	— 1.42	— 1.42	— 1.42	— 1.42
April		2.86	5.67	— 2.81	— 2.81	— 2.81	— 2.81
May		4.57	13.30	— 8.73	— 8.73	— 8.73	— 8.73
June		12.00	14.18	— 2.18	— 2.18	— 2.18	— 2.18
July		12.68	11.87	+ 0.81	+ 0.81	+ 0.81	+ 0.81
August		4.66	7.86	— 3.20	— 3.20	— 3.20	— 3.20
September		2.39	3.34	— 0.95	— 0.95	— 0.95	— 0.95
October		11.73	4.61	+24.72	+ 7.12	+ 7.12	+ 7.12
November		5.74	7.62		— 1.88	— 1.88	— 1.88
December		7.35	13.84		+25.85	+18.87	— 6.49
January	1935	4.28	10.11				— 5.83
February		12.56	4.12				+ 8.44
							—17.12

APPENDIX II.

(*a*) Soils of Variety Trial Sites.

Plantation :—	Sophia Sugar Experiment Station.													
Field No. :—	1 E.		5 E.		6 E.		11 E. A,B,C,D.		12 E. A,B.		13 E. A,B,C,D.		16 E. A,B,C,D.	
Sample No. :—	D. 652	D. 653	D. 724	D. 725	D. 726	D. 727	D. 885	D. 886	D. 883	D. 884	D. 780	D. 781	D. 782	D. 783
Sampling Depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.99	6.07	5.35	5.47	5.34	5.86	7.19	6.88	6.44	6.99	5.77	7.07	6.75	7.39
Exchange pH	5.36	5.42	4.12	4.61	4.16	4.88	6.68	6.07	5.41	5.91	4.92	5.80	5.93	6.24
M.P.S.	44.7	45.2	52.2	53.8	54.3	56.1	44.7	47.1	45.9	44.8	51.0	51.5	46.9	47.3
% Sand	2.3	2.6	2.4	2.6	3.3	2.5	2.0	2.1	5.0	1.0	4.0	2.4	15.4	13.3
Index of Texture	44	45	52	53	54	56	44	47	45	44	50	51	44	45
% Soluble Salts	0.289	0.439	0.075	0.273	0.066	0.235	0.096	0.176	0.038	0.129	0.084	0.166	0.124	0.171
% Organic Matter	1.48	1.19	1.78	0.91	2.31	0.79	1.64	0.95	1.61	0.99	1.63	0.63	1.39	0.65
% Nitrogen	0.124	0.063	0.136	0.092	0.155	0.087	0.146	0.099	0.139	0.111	0.131	0.082	0.125	0.074
Carbon/Nitrogen ratio	6.93	10.98	7.58	5.77	8.64	5.36	6.51	5.59	6.73	5.20	7.22	4.45	6.43	5.08
Rate of Solution	28	41	11	8	2	62	201	43	131	69	143	35	179	62
Lime requirement, Ton/acre $CaCO_3$	1.7	1.4	4.32	2.54	4.41	1.94	0.85	1.11	2.98	1.55	4.20	0.96	1.63	0.44

Appendix II. (*Contd.*).

(*a*) Soils of Variety Trial Sites.

Plantation :-	Sophia Sugar Experiment Station.													
Field No. :—	1 W.		2 W.		6 W. A.B.		10 W.		11 W.		13 W.		16 W.	
Sample No. :—	D. 794	D. 795	D. 799	D. 800	D. 896	D. 897	D. 803	D. 804	D. 790	D. 791	D. 898	D. 899	D. 784	D. 785
Sampling Depth :—	0—1 ft.	1—2 ft	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.79	6.84	5.42	6.14	6.44	7.71	5.92	6.58	5.94	6.99	5.74	7.07	6.15	7.98
Exchange pH	4.41	5.54	4.29	5.03	5.23	6.57	4.66	5.81	4.49	5.81	4.51	5.89	4.75	6.36
M.P.S.	50.1	54.5	50.3	57.2	49.6	51.3	48.3	51.8	49.0	49.9	49.8	54.7	43.1	45.6
% Sand	2.4	2.9	2.4	1.3	2.4	1.2	3.6	3.3	2.3	2.2	3.0	3.2	15.8	16.0
Index of Texture	50	54	50	57	49	51	48	51	49	50	49	54	40	43
% Soluble Salts	0.041	0.055	0.041	0.124	0.064	0.120	0.048	0.146	0.037	0.130	0.056	0.141	0.044	0.077
% Organic Matter	1.51	0.82	1.64	0.81	1.55	0.87	1.45	0.82	1.20	0.84	1.60	0.66	1.05	0.50
% Nitrogen	0.133	0.097	0.147	0.085	0.126	0.104	0.124	0.094	0.108	0.096	0.127	0.090	0.105	0.072
Carbon/Nitrogen ratio	6.58	4.93	6.48	5.51	7.16	4.88	6.77	5.04	6.45	5.07	7.34	4.29	5.80	4.00
Rate of Solution	4	250	79	15	187	95	39	63	32	54	78	34	170	83
Lime requirement, Ton/acre $CaCO_3$	4.5	1.6	4.9	2.7	2.69	0.38	3.6	1.3	3.5	1.4	4.31	1.42	2.5	0.2

APPENDIX II.—(*Contd.*).

(*a*) SOILS OF VARIETY TRIAL SITES.

Plantation :—	LA BONNE INTENTION.		OGLE.		WALES.		LUSIGNAN.		UITVLUGT.		DIAMOND.			
Field No. :—	22 C.M.		61 O.		4 B.V.		38 A.		13 E.		89 G.D.		90 G.D.	
Sample No. :—	D. 805	D. 806	D. 672	D. 673	D. 771	D. 772	D. 650	D. 651	D. 674	D. 675	D. 507	D. 508	D. 662	D. 663
Sampling Depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.37	5.23	5.24	5.06	4.87	4.68	4.80	4.66	4.80	5.12	4.6	4.6	4.70	4.31
Exchange pH	4.17	4.20	3.89	4.00	4.16	4.18	3.83	3.85	3.86	4.24	3.7	3.8	3.96	3.74
M.P.S.	43.4	46.6	38.1	47.2	53.3	55.2	42.6	42.5	47.4	48.1	49.6	49.6	57.8	59.0
% Sand	9.2	4.8	10.0	6.1	6.9	4.2	4.5	7.0	6.3	4.8	3.8	4.0	4.7	3.5
Index of Texture	42	46	36	46	52	54	42	41	46	47	49	49	57	58
% Soluble Salts	0.028	0.070	0.032	0.099	0.011	0.014	0.061	0.174	0.057	0.101	0.018	0.011	0.030	0.049
% Organic Matter	1.59	1.19	1.73	1.13	3.09	3.01	2.02	0.96	1.12	0.98	3.04	1.54	5.31	7.28
% Nitrogen	0.091	0.105	0.108	0.097	0.204	0.189	0.131	0.085	0.111	0.104	0.166	0.137	0.230	0.234
Carbon/Nitrogen ratio	10.46	6.58	9.28	6.73	8.77	9.23	8.94	6.53	5.85	5.48	10.7	7.30	13.40	18.05
Rate of Solution	284	177	394	13	18	5	81	38	8	36	0	1	68	47
Lime Requirement Ton/acre $CaCO_3$	5.80	4.60	5.84	4.91	14.33	14.60	9.4	5.6	6.08	3.33	14.3	12.36	13.4	15.0

APPENDIX II.—(*Contd.*).

(*a*) SOILS OF VARIETY TRIAL SITES.

Plantation :—	PORT MOURANT.								BLAIRMONT.			
Field No. :—	8 A.		28 A.E.		14 A.O.L.		15 A.O.L.		18 R.		4 H.P.	
Sample No. :—	B. 50	B. 51	B. 116	B. 117	B. 86	B. 87	B. 139	B. 140	B. 48	B. 49	B. 98	B. 99
Sampling Depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.72	5.64	5.90	6.59	5.87	5.83	6.01	6.01	4.81	4.62	4.95	5.44
Exchange pH	5.05	4.81	4.78	5.34	4.69	4.81	4.97	5.27	3.58	3.58	3.78	4.01
M.P.S.	49.6	51.6	45.1	43.7	42.1	43.6	48.3	50.3	42.7	48.7	56.1	50.1
% Sand	44.7	4.5	3.8	2.7	3.0	2.4	5.5	5.0	10.2	7.8	7.7	2.6
Index of Texture	41	51	44	43	41	43	47	49	41	47	55	50
% Soluble Salts	0.222	0.160	0.045	0.081	0.041	0.114	0.051	0.161	0.027	0.034	0.028	0.033
% Organic Matter	0.98	1.84	1.86	1.19	1.88	1.38	2.23	1.22	1.73	1.46	6.11	1.69
% Nitrogen	0.091	1.151	0.141	0.110	0.152	0.109	0.177	0.120	0.134	0.120	0.337	0.128
Carbon/Nitrogen ratio	6.28	7.08	7.64	6.28	7.17	7.37	7.31	5.89	7.52	7.07	10.52	7.66
Rate of Solution	12	34	121	31	173	55	57	47	34	17	24	11
Lime Requirement Ton/acre $CaCO_3$	2.1	3.8	2.78	1.37	4.1	3.1	4.3	2.58	10.7	12.4	9.11	4.11

Appendix II.—(*Contd.*).

(*b*) Soils of Manurial Trial Sites.

Plantation :—	Blairmont.		Enmore.		Rose Hall.					
Field No. :—	15 Haly Polder.		8 Bachelor's Adventure.		30 Rose Hall.		19 Lot 20.		20 Tappinsburg.	
Sample No. :—	B. 167	B. 168	D. 716	D. 717	B. 108	B. 109	B. 182	B. 183	B. 212	B. 213
Normal pH	4.88	5.26	5.28	5.22	5.77	6.09	5.00	5.86	5.20	5.25
Exchange pH	4.00	4.05	4.21	4.09	4.80	5.08	4.39	5.32	4.10	4.37
M.P.S.	52.2	45.8	48.4	50.3	50.4	51.7	52.3	51.8	50.8	52.7
% Sand	5.4	4.7	2.7	2.0	3.7	2.6	4.0	3.1	4.4	5.1
Index of Texture	51	45	48	50	50	51	52	51	50	52
% Soluble Salts	0.055	0.046	0.098	0.183	0.048	0.143	0.226	0.269	0.039	0.090
% Organic Matter	5.97	4.84	2.16	1.29	2.00	1.36	2.78	0.96	2.10	1.74
% Nitrogen	0.408	0.312	0.155	0.102	0.157	0.109	0.231	0.115	0.168	0.156
Carbon/Nitrogen ratio	8.50	9.00	8.10	7.34	7.40	7.25	6.99	4.89	7.24	6.46
Rate of Solution	−55	9	170	55	306	−2	32	3	45	54
Lime Requirement, Ton/acre $CaCO_3$	9.8	8.7	5.45	3.69	3.36	1.73	6.2	2.4	6.0	4.0
Available P_2O_5 p.p.m. (Truog)	35	19	52	30	16	24	14	60	18	20
Citric P_2O_5 p.p.m.	133	48	208	56	44	26	42	36	31	23
Exch. and water sol. bases mg. eqs. /100 gms.										
Lime	6.55	4.07	7.70	5.10	10.40	12.00	6.75	6.80	5.40	4.41
Magnesia	11.18	14.81	10.05	12.60	12.30	15.95	18.24	15.00	11.53	10.84
Potash	0.92	0.33	0.47	0.39	0.14	0.23	0.77	0.49	0.38	0.31
Soda	0.63	1.65	1.24	3.71	0.15	0.72	1.38	2.51	0.90	1.12

APPENDIX II.—(*Contd.*).

(*b*) SOILS OF MANURIAL TRIAL SITES.

Plantation :—	UITVLUGT.						PORT MOURANT.				LUSIGNAN.			
Field No. :—	75 Zeeburg.		94 Met-en-Meerzorg.		14 Zeeburg.		4 House End.		13 Resource.		4 Empolder.		28 East Good Hope.	
Sample No. :—	D. 501	D. 502	D. 702	D. 703	D. 751	D. 752	B. 104	B. 105	B. 210	B. 211	D. 706	D. 707	D. 708	D. 709
Normal pH	4.7	4.5	4.88	4.66	5.62	5.79	6.21	6.63	4.97	4.97	5.00	4.85	5.07	4.03
Exchange pH	3.8	3.7	3.88	3.41	4.25	4.36	4.82	5.55	4.05	4.24	3.57	3.77	4.30	4.48
M.P.S.	56.8	54.8	65.7	59.6	44.0	45.8	49.8	54.7	51.4	52.7	59.3	59.3	50.4	48.7
% Sand	6.4	6.9	4.1	2.7	4.8	2.3	1.2	0.9	3.7	2.4	2.8	2.1	4.2	5.0
Index of Texture	56	53	65	59	43	45	50	55	51	52	59	59	50	48
% Soluble Salts	0.023	0.020	0 029	0.036	0.023	0.048	0.045	0.131	0.061	0.154	0.021	0.032	0.120	0 227
% Organic Matter	5.11	...	5.87	5.19	0.98	0.64	2.30	0 98	2.74	1.23	3.80	2.55	2.09	0.98
% Nitrogen	0.295	...	0.185	0.148	0.104	0.076	0.173	0.092	0.199	0.149	0.263	0.169	0.165	0.085
Carbon/Nitrogen ratio	14.5	...	18.4	20.3	5.44	4.89	7.72	5.89	7.99	5.09	8.39	8.74	7.33	6 66
Rate of Solution	0	11	−7	24	21	18	107	35	16	−4	−6	−10	23	42
Lime Requirement Ton/acre $CaCO_3$	14.5	...	12.72	16.28	6.96	3.93	3.57	1.01	11,2	5.0	14.78	9.83	5.06	2.90
Avail. P_2O_5 p.p.m. (Truog)	42	31	30	33	30	22	nil	50	18	21	15	15	15	10
Citric P_2O_5 p pm.	150	67	208	75	66	48	44	28	75	23	139	71	75	25
Exch. and water sol. bases mg. eqs./100 gms.														
Lime	2.97	2.37	1.80	1.32	4.40	4.50	8.20	7.00	6.02	5.55	5.56	5.36	7.92	5.28
Magnesia	2.53	4.16	0.80	0.64	7.85	12.65	14.20	16.25	9.83	12.69	0.04	9.00	10.72	12.36
Potash	0.25	0.49	0.13	0.24	0.24	0.19	0.36	0.27	0.34	0.31	0.42	0.31	0 38	0.49
Soda	0.03	0.14	0.05	0,12	0.45	1.29	1.13	1.72	1.19	1.89	0.29	0.60	0 69	0.68

Appendix II.—(*Contd.*).

(*b*) Soils of Manurial Trial Sites.

Plantation :—	Cane Grove.						Versailles.		Wales.	
Field No. :—	51 Melville.		53 Melville.		63 Melville.		31 R.D.Z.		9 Cottage.	
Sample No. :—	D. 908	D. 909	D. 910	D. 911	D. 904	D. 905	D. 753	D. 754	D. 890	D. 891
Normal pH	4.41	4.77	4.70	4.92	4.83	3.28	4.95	4.87	4.59	4.72
Exchange pH	3.57	3.69	3.60	3.72	3.86	3.02	4.03	4.04	4.06	4.02
M.P.S.	51.9	49.7	49.9	47.6	52.7	57.2	51.4	51.2	64.9	56.8
% Sand	8.9	7.0	2.7	3.7	5.0	4.5	5.4	8.5	6.6	5.7
Index of Texture	50	48	49	47	52	56	50	50	64	56
% Soluble Salts	0.034	0.018	0.020	0.018	0.033	0.339	0.015	0.014	0.041	0.040
% Organic Matter	4.91	3.20	4.15	1.89	7.18	12.0	4.44	3.37	6.93	3.06
% Nitrogen	0.295	0.200	0.189	0.147	0.348	0.285	0.272	0.240	0.350	0.266
Carbon/Nitrogen ratio	9.65	9.27	12.8	7.45	12.0	24.4	9.46	8.14	11.5	6.65
Rate of Solution	–1	6	2	12	12	49	–1	–9	–6	–7
Lime Requirement Ton/acre $CaCO_3$	19.0	15.4	15.7	13.0	15.0	14.4	20.28	19.56	17.4	13.1
Avail. P_2O_5 p.p.m. (Truog)	10	10	10	10	10	10	32	22	38	20
Citric P_2O_5 p.p.m.	44	17	26	8	38	11	133	100	167	67
Exch. and water sol. bases mg. eqs./100 gms.										
Lime	2.70	3.22	3.90	3.65	3.57	3.75	1.20	1.50	2.74	1.55
Magnesia	2.58	2.64	2.93	7.35	2.86	5.93	0.30	0.45	4.35	3.67
Potash	0.36	0.27	0.44	0.32	0.39	0.18	0.06	0.07	0.18	0.16
Soda	0.38	0.32	0.27	0.52	0.46	0.60	0.00	0.00	0.15	0.11

APPENDIX II.—(*Contd.*).

(*c*) SOILS OF FLOOD-FALLOW TRIAL SITES.

Plantation :—	LUSIGNAN.				PORT MOURANT.			
Field No. :—	F.		H.		28 Tain Windward.		28 Tain Leeward.	
Sample No. :—	D. 718	D. 719	D. 720	D. 721	B. 100	B. 101	B. 102	B. 103
Normal pH	5.01	4.89	5.01	4.83	5.79	6.56	5.92	6.29
Exchange pH	3.77	3.83	3.71	3.77	4.73	5.52	4.73	5.42
M.P.S.	49.8	52.7	51.3	49.8	50.6	52.0	51.1	56.0
% Sand	3.7	2.6	5.6	2.9	2.5	2.1	3.2	1.3
Index of Texture	49	52	50	49	50	52	50	56
% Soluble Salts	0.089	0.187	0.076	0.160	0.089	0.224	0.095	0.243
% Organic Matter	1.05	1.39	1.69	1.26	2.46	1.01	2.71	1.04
% Nitrogen	0.123	0.095	0.131	0.100	0.178	0.101	0.169	0.095
Carbon/Nitrogen ratio	4.978	8.497	7.482	7.340	8.017	5.792	9.315	6.348
Rate of Solution	—113	7	8	30	58	11	12	43
Lime Requirement Ton/acre $CaCO_3$	6.88	6.00	7.50	6.20	3.51	1.46	3.49	1.39

APPENDIX III.

Calendar of Agricultural Operations on Manurial Trial Areas.

Experiment No.	Page of Bulletin.	Estate.	Field.	Variety.	System of Replication.	Size of Plots, Acres.	Date of						
							Planting.	Applying Limestone and/or Slaked Lime.	Applying Potash.	Applying Phosphate.	Applying Sulphate of Ammonia.	Flooding Field.	Reaping.
A2	75 76	Rose Hall	30 R.H.	D. 625	A four by four Latin Square	0.048	27.I.33	2.II.33[1, 4]	13.IV.33[1, 4]	13.IV.33[1, 4]	2.III.33[1] 24.III.34[2]	For 4½ months previous to planting	7.III.34[1] 5.III.35[2]
C5	92 93	„	20 T.	D. 625	A five by five Latin Square	0.051	27.III.34	5.V.34[1, 4]	—	6.IV.34[1]	19.V.34[1, 4]	9.IX.33 to 27.II.34	12.III.35[1]
C1	89 91	„	19 L. 20	D. 625	A five by five Latin Square	0.049	20.X.33	—	—	4.XI.53[1]	4.XI.33[1, 4]	For 6½ months previous to planting	16.X.34[1]
A8	84	Lusignan	4 Emp.	D. 625	A five by five Latin Square	0.051	18.XII.32	9.I.33[1, 4]	—	—	9.II.33[1] 10.IV.34[2]	October 1931 to November 1932	27.II.34[1] 12.II.35[2]
A4	75 76	„	28 E.G.H.	D. 625	A four by four Latin Square	0.051	25.XII.32	9.I.33[1, 4]	—	9.II.33[1, 4]	9.II.33[1] 10.IV.34[2]	December 1931 to November 1932	6.III.34[1] 7.II.35[2]
C2	89 91	Blairmont	15 H.P.	D. 625	A five by five Latin Square	0.051	29.VIII.33	—	—	2.XI.33[1]	2.XI.33[1] 3.X.33[1, 4]	For 7½ months previous to planting	9.XI.34[1]
A3	75 76	Enmore	8 B.A.	D. 625	A four by four Latin Square	0.051	2.XII.32	2.XII.32[1, 4]	—	—	10.I.33[1] 29.III.34[2]	26.III.32 to 21.XI.32	23.II.34[1] 12.II.35[2]
C3	89 91	Cane Grove	51 M.	P.O.J. 2878	A five by five Latin Square	0.051	14.IV.34	—	—	15.VI.34[1]	15.VI.34[1, 4]	—	22.V.35[1]
C6	92 93	„	53 M.	P.O.J. 2878	A five by five Latin Square	0.051	14.IV.34	—	—	15.VI.34[1]	15.VI.34[1, 4]	—	21.V.35[1]

[1] Plants. [2] First Ratoons [3] Second Ratoons. [4] Basic Application.

CALENDAR OF AGRICULTURAL OPERATIONS ON MANURIAL TRIAL AREAS.

Experiment No.	Page of Bulletin.	Estate.	Field.	Variety.	System of Replication.	Size of Plots, Acres.	DATE OF						
							Planting.	Applying Limestone and/or Slaked Lime.	Applying Potash.	Applying Phosphate.	Applying Sulphate of Ammonia.	Flooding Field.	Reaping.
A6	80	Cane Grove	63 M.	D. 625	A five by five Latin Square	0.054	31.III.34	11.V.34[1,4]	—	11.V.34[1,4]	15.VI.34[1]	—	3.V.35[1]
B1	88	Uitvlugt	75 Z.	D. 625 and D. 118 Mixed	12 Randomised Blocks of 7 Treatments	0.051	30.IV.31	30.IV.31[1]	—	—	—	—	10.IX.32[1] 7.IX.33[2] 17.X.34[3]
A1	75 76	Port Mourant	4 H.E.	D. 625	A four by four Latin Square	0.051	23.XII.32	17.XII.32[1,4]	—	26.I.33[1,4]	26.I.33[1] 24.III.34[2]	19.II.32 to 30.XI.32	23.II.34[1] 13.III.35[2]
C4	92 93	,,	13 R.	D. 625	A five by five Latin Square	0.051	6.I.34	26.I.34[1,4]	—	27.II.34[1]	28.II.34[1,4]	21.IV.33 to 23.XII.33	14.III.35[1]
A10	84 87	Uitvlugt	94 M.Z.	D. 625 and D. 118 Mixed	A five by five Latin Square	0.051	5.XI.32	10.XI.32[1,4]	20.XII.32[1,4] 8.III.34[2,4]	—	20.XII.32[1] 19.II.34[2]	10.V.32 to 2.X.32	28.XI.33[1] 16.XI.34[2]
A5	79	,,	14 Z.	D. 625	A four by four Latin Square	0.041	25.II.33	1.III.33[1,4]	13.IV.33[1,4] 21.VI.34[2,4]	13.IV.33[1,4]	13.IV.33[1] 24.V.34[2,4] 21.VI.34[2]	For 5 months previous to planting	9.III.34[1] 5.III.35[2]
A7	80	Wales	9 C.	Diamond 10	A five by five Latin Square	0.051	24.II.34	28.II.34[1,4]	18.V.34[1,4]	—	18.V.34[1]	June 1933 to January 1934	16.III.35[1]
A9	84 86	Versailles	31 R.D.Z.	D. 625 Mixed	A five by five Latin Square	0.051	14.II.33	7.III.33[1,4]	12.V.33[1,4]	—	12.V.33[1] 28.IV.34[2,4] 22.VI.34[2]	Unflooded Pegasse	15.III.34[1] 13.III.35[2]

[1]Plants. [2]First Ratoons. [3]Second Ratoons. [4]Basic Application.